Scanning -- Shortwave -- Satellites -- Ham Radio -- Computers

Monitoring Times

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Volume 23, No. 1
January 2004

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Scanning the Fury of Fire

Also in this issue:
- Record Solar Flare and Propagation Predictions
- Radio Monitoring in Croatia
- Railscanning

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AOR SDU5600 Spectrum Display Unit

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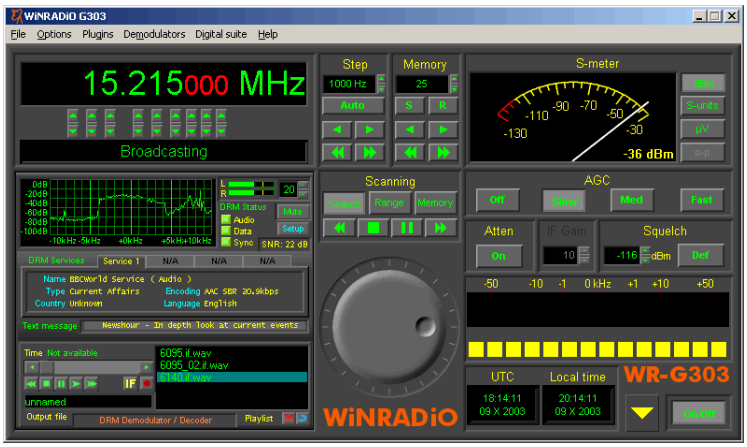
The Serious Choice in Advanced Technology Receivers™

When it comes to shortwave, we have some new surprises up our sleeve...

Announcing another state-of-the-art development from WiNRADiO:
A DRM decoder and demodulator for the WiNRADiO G303 receivers, which have now become the world's first fully integrated DRM-capable receivers, pioneering the DRM technology for the benefit of the radio enthusiast and professional community.

DRM (Digital Radio Mondiale) is a non-proprietary digital system for short-wave, medium-wave and long-wave bands which offers a dramatic improvement over conventional analog AM transmissions with its near-FM quality of sound.



... and when it comes to VHF/UHF, our receivers and their numerous accessories just keep on surprising you.

NEW AX-37A Antenna

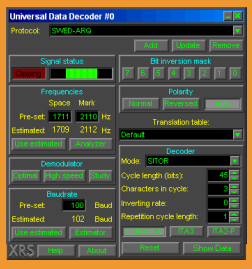
A compact, wide-band UHF antenna to 3GHz, with an built-in low-noise amplifier. Suitable for monitoring and surveillance.

NEW Field Strength Logger Option

Adds a calibrated field strength meter and logger to any WiNRADiO 3000 Series receiver. Supplied with a GPS unit and useful for geographical signal coverage surveys.

FSK Decoder

With powerful decoding and analysis tools, the WiNRADiO Universal FSK Decoder is useful for FSK signal analysis and decoding.



Client/Server Option

This option makes it possible to remotely control a WiNRADiO receiver across LAN and WAN computer networks. A WiNRADiO receiver can be remotely controlled and listened to from anywhere in the world.

Advanced Digital Suite Option

Audio oscilloscope and spectrum analyzer, weather fax, ACARS, NAVTEX, DTMF and sophisticated audio recorder are only a few from the many useful features this option provides.

Database Manager

Access and maintain frequencies. Includes a database of 300,000 world-wide frequencies.

Telephone Control Interface

Control a WiNRADiO receiver from a dial-up telephone anywhere in the world.

Trunking Option

Join the trunked radio revolution with this option.

PCMCIA and USB Adapters

Connect a WiNRADiO receiver to your laptop via standard PCMCIA or USB sockets.

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Rechargable mobile power for your WiNRADiO receiver.

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Monitoring Times

Vol. 23, No. 1 January 2004

Cover Story

Air Attack: California's Airborne Firefighters

By Laura Quarantiello

In the unique terrain and seasonal fire climate of southern California, the airborne firefighters of the California Department of Forestry are a critical part of the defense against wildfires. Air tankers and helicopters can drop fire retardant in areas that ground teams can't access, but wind, smoke, and darkness make their job almost as risky as being on the ground.

The author lives outside San Diego and listened to the drama being played out between aircraft and base stations during the recent California fires. In addition to frequencies for the airborne firefighters, a sidebar story includes additional CDF frequencies and another first-person account of monitoring during the Grand Prix Fire.

Story starts on Page22.

Cover photo courtesy **http:// www.powayfire.com** - *chris@yandall.com*

C O N T E N T S

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Reviews:

The monitor who owns more than two radios and listens to them simultaneously may be lucky, but he may also be very confused! The answer may be found in the **NCS-3230 Multi-Rx** audio mixer from New Communications Solutions. Check out page 78 to see how this useful monitoring tool works.

Wireless networking can be a challenge in urban or wooded locations where signals may be blocked or deflected. **Wi-Fi Plus** thinks it has the solution in its new line of innovative antenna designs (page 82).

Dude! You won't believe the super cool features on Cobra's **76XTR Xtreme Street Communicator**. Okay, so it's a CB radio, but you've never seen one like this before. (See page 86.)

Also this month, John Catalano continues his look at receiving digital HF (**DRM**) and this month he actually succeeds. Check out your hardware needs for DRM on page 80. *MT* reader Dino Papas takes his **AVCOM** spectrum display monitor on a visit to the factory at AVCOM of Virginia, and you're invited along, too (page 83).

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THE VERY BEST IN SHORTWAVE RADIOS

YB 400PE AM/FM/ Shortwave Radio

This high-performance PLL synthesized, dual-conversion YB 400PE receiver pulls in AM, FM-Stereo, Shortwave, and Longwave, including continuous coverage from 520-30,000 KHz. Even Ham radio two-way communications can be heard using the SSB circuitry. Its highly sensitive auto-tuning system stops even on weak stations within the international Shortwave broadcast bands. Its 40 programmable memory presets allow quick, easy access to your favorite st tions. **Key features include:**

- Easy tuning with direct frequency entry, up/down buttons, and auto-scan
- Multifunction LCD displays time, frequency, band, alarm wake time, and sleep timer
- Sleep timer, dual clocks, and dual alarm modes wake you with beeper or radio play
- Built-in antennas for complete portability and socket for supplementary Shortwave antennas
- Includes AC adaptor, earphones, carrying pouch, supplementary Shortwave wire antenna, and batteries

$149.95

YB 550PE AM/FM/ Shortwave Radio

Unique features define the model YB 550PE, such as 200 randomly programmable memory presets with user-defined memory page customizing, digital fine-tuning control, and favorite station wake-up memory. Through its PLL synthesized digital tuner, receive AM, FM-Stereo, and Shortwave with excellent sensitivity and selectivity. Enjoy the entire Shortwave spectrum that includes all 14 international broadcast bands and continuous Shortwave coverage of 520-29,999 KHz. Its auto-tuning system stops even on weak stations within the international Shortwave spectrum, or with the direct frequency entry system, go instantly to any frequency in its tuning range. **Key features include:**

- Signal strength and battery power level indicators
- Digital clock with selectable 12/24 hour clock display format
- LCD with display light that shows simultaneous display of frequency and clock
- Alarm with snooze feature and 10-90 minute sleep timer
- Includes built-in antennas, sockets for supplementary Shortwave and FM antennas, earphones, and optional AC adaptor

$99.95

S350 AM/FM/ Shortwave Radio

Incorporating a sensitive, high-performance analog tuner with digital frequency readout, the S350 receives AM, FM-Stereo, and continuous Shortwave coverage of 3,000 to 28,000 KHz, including all 14 international broadcast bands. Its classic analog tuning knob with superimposed fine-tuning control makes it a pleasure to operate, and the variable RF gain control, wide/narrow bandwidth selector and low pass filter give you complete control over incoming signals. Operates on 4 'D' batteries for long battery life. **Key features include:**

- Multifunction LCD shows digital frequency, clock, and more
- Alarm and 1-90 minute sleep timer
- Variable, independent bass and treble controls
- Left/right line-level outputs (stereo in FM)
- Includes built-in antennas, sockets for supplementary Shortwave and FM antennas, convertible nylon handle/carrying strap, earphones, and optional AC adaptor

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FR200 AM/FM/ Shortwave Emergency Radio

Requiring no external power source, the FR200 is a versatile multi-purpose tool for keeping informed, entertained, and safe. Combining AM/FM/Shortwave radio and flashlight in one, the FR200 operates without batteries – powered by its built-in hand-crank generator – allowing you to listen to news, music, and international programming from anywhere, including places where power is a problem. **Key features include:**

- AM/FM/Shortwave Tuning (SW1, 3.2-7.6MHz; SW2, 9.2-22MHz)
- Hand-crank power generator recharges internal Ni-MH battery
- Built-in flashlight perfect for emergencies or camping
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- Can also operate on 3 AA batteries or optional AC adaptor

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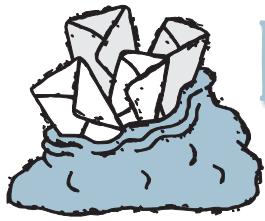

LETTERS TO THE EDITOR

Happy New Year!

Welcome to a new year of mutual discoveries and enjoyment of the radio waves, as *Monitoring Times* starts into its 23rd year as your monitoring companion. Here are a few changes we are introducing in 2004 to add to our comprehensive coverage:

A new transportation column will begin in February, entitled "Boats, Planes, and Trains." We are proud to announce new authors for each of the segments as follows: Ron Walsh, VE3GO/VE3IDW, a past president of Canadian Amateur Radio Federation (now part of RAC) and avid Great Lakes ship enthusiast, will edit "Boats"; Iden Rogers, K6JHQ, first editor of the *RCMA Bulletin* and creator of the Yahoo group AirCommSouthwest, will edit "Planes"; and Gary Sturm, co-author of the book *Compendium of Railroad Radio Frequencies* and author of the feature in this issue, will edit "Trains." You can correspond with any of these authors via their *MT* email address: fistlast@monitoringtimes.com

We also welcome long-time contributor and dedicated federal and military monitor Chris Parris as the new editor of *The Fed Files* column (which will run in rotation with the transportation column). Larry Van Horn is retiring from the column after many years to dedicate more time to other writing projects. Please give Chris your support in his new column, which runs this month.

Keep Radio Open to the Public

"On October 25th, 2003 I was in the path of the Grand Prix Fire that ripped through northern Fontana and Rancho Cucamonga before heading towards Claremont and La Verne (among other places) here in Southern California. I cannot tell you how much information I gained from monitoring my scanners as the flames approached my location. This sort of information flow, directly from the source, is of much more use than the local television news broadcasts which started neglecting our area as soon as other fires began breaking out.

"About 8:00 o'clock that evening, long before the fire had reached my neighborhood, I drove four blocks north of my house to assess the progression of the fire. I listened to the radio traffic on both VHF and 800 MHz as the fire slowly crept towards my neighborhood. About 9:15 p.m., as I stood there outside of my pickup, the Santa Ana winds kicked up in my area (the first gust almost knocked me over) and blew the fire up into a massive fire ball and sent it on a rapid heading toward the area just north of where I was parked. I decided to get the heck out of there right then and there and head back home.

"Once I arrived home, a couple of neighbors from across the street came over and asked me what I knew of the current situation. The next door neighbor also drove up about that time with her mini van full of personal belongings. She and her kids appeared to be quite anxious, almost in a panic. I was able to apprise them all of the fire's current location and that went a long way towards calming everyone down quite a bit. Shortly after I went inside my house, the power went out in our entire neighborhood.

This picture captures working conditions on San Antonio Heights on the night of 10/25, as recorded by Todd Stout's friend with San Bernadino County Station 48.

"The rest of that night, as I sat in the dark house with only a battery powered lantern, two of my handheld scanners kept me apprised of the progression of the fire. Over the next several hours, I listened in as the fire burned through many homes and came towards my neighborhood on two more occasions when the wind shifted direction.

"The type of information that can be gathered directly from the source in an emergency situation is vital for public safety, and for this reason I feel that radio systems need to remain open to the public to monitor. I do understand the need to have a few encrypted channels for sensitive communications, but day to day activities of both fire and law enforcement should remain in the clear for just this type of disaster situation.

" Most radio USFS/CDF traffic was occurring on 154.265 OES WHITE 2 as the fire burned above the city, although Rancho Cucamonga FD was using their 800MHz tactical talkgroups on the West End Communications Authority's trunked radio system (system #9 as listed on http://www.trunkedradio.net). I also heard 154.280 and 154.295 in use as well but not as much as the aformentioned channels/frequencies."

– Todd Stout, KD6ECZ

Applause for ARINC and *MT*

" Just picked up my November Issue of *MT*. Thumbed through it really fast for the preview.

"*Utility World* caught my eye. Lately I have been searching the internet for aero frequencies in the HF/VHF range. Noticed the article was about ARINC's HF network. I had already gained that information by visiting the ARINC website. Hugh may know this [*He does - ed.*] but at the ARINC website you can download the pdf version of a Jeppesen chart that has all the information for all the ARINC's frequencies, maps and network boundaries. There is one for the Atlantic, Pacific, USA VHF aeronautical, VHF ground, Mexico ground and Mexico aeronautical frequencies. I had downloaded them all. Best of all it's free!

"Three things that I love about the radio monitoring hobby

1. A good radio with antennas.
2. A good magazine (*Monitoring Times*)
3. A good search engine (Copernic Agent and Google)

"Have to go, *MT* looks too interesting right now..."

– Glenn Blum kd5dga

"Your magazine has become a World Class source of information on all aspects of the radio hobby. I appreciate the encouraging information for beginners and your emphasis on the positive, legal uses of the RF spectrum. After being a ham for 45 years, I

can say *Monitoring Times* complements *QST*, and it does not try to mimic or duplicate it in any way. Keep up the excellent work!"

– 73, Paul Gili, AA1LL, Mason, NH

Overseas Purchase Woes

Dennis Hewitt encountered an unusual problem when trying to order the software for DRM reception, and wonders if other readers have had similar problems. "This morning, via the http://www.winradio.com web site, I contacted the Merlin communications web site and entered an order for the DRM software download.

"My order was declined with two entry attempts, after which I logged off the Internet. My telephone immediately started ringing, and it was the fraud department of my credit card bank in Virginia. Their red flag was on the transaction I had just attempted. They stated the merchants number was valid, but based on additional information in their possession, they had stopped the transaction due to fraud concerns, and for the safety of my credit card number!

"I understand as *MT* publisher, you are not responsible for the conduct of web sites mentioned in a multitude of articles, but I raise this issue based on the concern that if financial institutions involved with transactions (actual or attempted) are raising red flags that something is amiss that warrants a detailed investigation."

– Dennis Hewitt

We have heard of no one else having similar problems, but we have heard of many folks who have successfully ordered and received the software. In these times of rampant fraud, no doubt international transactions come under closer scrutiny, but we know of no reason not to trust the Merlin site. Readers?

If you think this kind of problem is limited to Internet transactions, Bob Fraser had a problem simply trying to order the BBC radio magazine *On Air* by mail. "For over 40 years, I have been using the international postal money order, primarily to collect historical information in England. And I have ordered and renewed the BBC radio magazine for at least the last 10 years and paid for it that way."

But recently his international postal money order was returned by the BBC, as I understand it, because it was payment in US funds on a US bank. I note that the US Postal Service has agreements with only 30 countries to accept the international money orders, primarily Canada, Mexico, and various Caribbean Islands. Gayle Van Horn had the same experience when she tried to order a hobby book from Denmark using an international money order. Our advice – consult and use the method preferred by the company from which you're trying to make your purchase.

Sun-Struck

"What an unusual geo/solar event for the communications community: the solar flare, which devastated the HF frequencies at the end of October. From 0800 UTC, October 29 until 0220 UTC October 30, I could not hear one signal on the HF bands.

"I was an SWL at age 7, ham at 12, Navy radio operator, 1967-1975, and hold radio telephone and telegraph licenses. I have an adequate receiver, a decent 33 ft., end-fed wire at a height of 46 ft., and not a signal to be heard from 2 to 30MHz! Drats! Most disturbing: I had hoped to snag some raspy auroral activity on 28MHz CW – but no one was home.

"The year 1989 was the last time I heard *this* degree of radio wave disturbance. I suppose that no matter what skills or equipment we possess, Mother Nature always has the final word.

"I love reading *MT*! In my humble opinion, your magazine offers the most info to us radio hobbyists."

— D. Unger, Baltimore, M.D.

We welcome your ideas, opinions, corrections, and additions in this column. Please mail to ***Letters to the Editor,*** 7540 Highway 64 West, Brasstown, NC 28902, or email *editor@monitoringtimes.com*. Letters may be edited for length and clarity.

Happy monitoring!

-Rachel Baughn, KE4OPD, editor

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Monitoring and the Law

Jorge Rodriguez
jorgerodriguez@monitoringtimes.com

On Air but no longer On Line

Several months ago, visitors to the Palm Beach County Florida Fire Rescue web site were greeted with the following message when they tried to link to that site's live scanner audio. "Due to implementation of recently enacted HIPAA (Health Insurance Portability and Accountability Act) regulations, Palm Beach County Fire Rescue's live scanner site has been discontinued indefinitely."

Similarly around the nation, officials at the local government level are taking notice of their own municipalities' police and fire audio being rebroadcast (or webcast as it's now called) live on the Internet. Some cities are trying to put a stop to it.

In the case of Palm Beach County, officials are concerned that their own participation in the rebroadcast of private, personal medical information could violate HIPAA. The Health Insurance Portability and Accountability Act of 1996 (Public Law 104-191) was enacted as part of a broad Congressional attempt at healthcare reform. The Administrative Simplification aspect of HIPAA requires the United States Department of Health and Human Services (DHHS) to develop standards and requirements for the maintenance and transmission of health information that identifies individual patients.

This "simplification" is to improve the efficiency and effectiveness of the healthcare system by standardizing the exchange of electronic data for certain specified administrative and financial transactions. It is also to protect the security and confidentiality of electronic health information, and this is where it conflicts with live scanner audio online.

It is in this maintaining of privacy due to HIPAA that Palm Beach County and others have become concerned. All healthcare organizations that maintain or transmit electronic health information must comply with HIPAA. As a health care provider, Palm Beach Fire Rescue found itself in the uncomfortable position of potentially revealing private, personal medical information unintentionally to anyone who was listening to their online live scanner audio. Since wrongful disclosure of individually identifiable health information could result in a fine of $50,000 and or imprisonment up to one year, the decision was made to suspend the live scanner audio feed.

Legal Grounds?

Which laws may prohibit and which laws may protect the webcasting of live scanner audio online has been the topic of many postings on the several forums of user groups dedicated to the subject. Early in 2003, Steve Grasha, the 44 year old publisher of an online newspaper in Palm Springs, California, received a notification from the City of Palm Springs asking him to stop his webcasting of that city's police and fire radio communications.

At the beginning of 2003, Grasha had added a link to his online newspaper's web site which allowed others to listen in on the live scanner audio of the Palm Springs Police and Fire. According to *The Desert Sun*, another Palm Springs newspaper, Grasha is a perpetual candidate for City Council and mayor.

Grasha, who studied police science and graduated from Fullerton College and the North Orange County Police Reserve Academy in 1981, should know the law. He has previously worked on Capitol Hill as administrative assistant in the U.S. Congress. He's been assistant to the Mayor of the City of Buena Park, California. And he's worked as campaign coordinator for former entertainer-turned-Senator Sonny Bono. So why would someone like this ignore the pleas of a city official accusing him of violating the law?

In an April message, James W. Runge, Director of Information Technology for the City of Palm Springs wrote:

> *Hello Mr. Grasha. This is to inform you that you are in violation of Title 47 Section 605 of the United States Code. This refers to the "Unauthorized publication or use of Communications". The penalties for this section are fines up to $50,000 and or 2 years in prison. The FCC is aware of this violation but I have asked them to let me handle it first. I request the [sic] you remove our frequencies from your web site at once. Failure to do so will result in my turning this over to the FCC to handle. Your immediate cooperation in this matter is appreciated. Please let me know when you have removed our frequencies.*

Thus began an exchange between the City of Palm Springs and Mr. Grasha's newspaper, The Palm Springs *Village Voice* in an article headed "Title 47 of the United States Code Section 605 versus the First Amendment." Mr. Grasha replied:

> *I suggest you read the constitution of the United States of America. You might start with the first amendment.*
>
> *As a recognized member of the press, I am certain that the first will way [sic] heavily on any courts decision in this case!*

AMENDMENT I

Congress shall make no law respecting an establishment of religion, or prohibiting the free exercise thereof; or abridging the freedom of speech, or of the press; or the right of the people peaceably to assemble, and to petition the government for a redress of grievances.

Steve Grasha
Publisher
The Palm Springs Village Voice

And the City responded:

> *I would suggest that you read title 47 chapter 5 subchapter VI section 605 of the United States Code. If it is not removed from the site in 24 hours it will be turned over to the FCC for enforcement. They are already aware of it and wanted to enforce it right away, but I asked them to wait until I could notify the owner of the site. If you continue to broadcast it action will be taken.*

In the end Mr. Grasha's newspaper and the City of Palm Springs quietly moved on to other issues. A visit to *The Palm Springs Village Voice* web site today reveals no links that we could find to online live scanner audio from Palm Springs or anywhere else.

Plenty of Online Action

As for online live scanner audio, it's alive and well in America for now. A recent visit to an online forum on the topic where users can share information counted almost ten thousand messages since the year 2000 when the group started. An online search turns up dozens of police and fire dispatch channels available via online streaming.

Attempts to contact representatives of Palm Beach County, the City of Palm Springs, and the Palm Springs *Village Voice* whose web site was last updated at the start of last fall were unsuccessful.

Disclaimer

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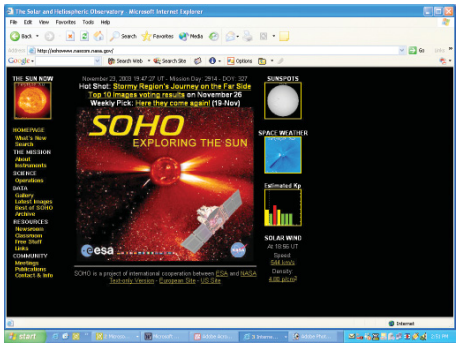
Space Environment Center at Risk

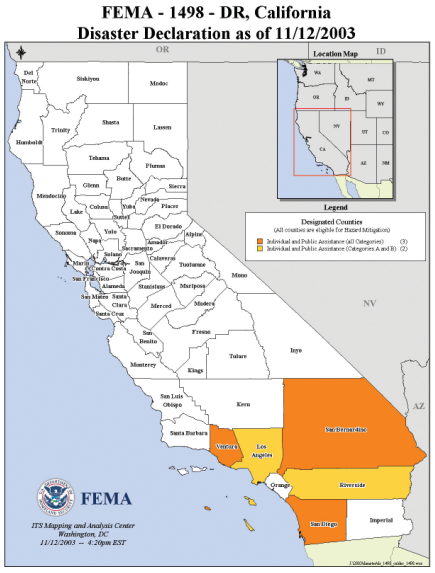
There is a certain irony in the fact that as the Sun was exploding in the largest solar storms in 30 years, Congress was threatening to close down the federal space environment Center that warns satellite and power grid operators of impending solar interruptions. House and Senate appropriations committee plans include slashing or even the deleting the center's budget.



Perhaps it would have helped the SEC's case if the power grid suffered disruption or if the US lost a satellite (as Japan did). The X28 class flare was largest explosion ever recorded in our solar system – so far off the charts the instruments were maxed out for 13 minutes and its strength could only be estimated. Fortunately, the blast wasn't aimed at earth, but it was in a great position for taking images. (See this month's feature story by Tomas Hood, NW7US.)

Firefighting Radio Frustrations

Among the post-mortems being conducted following the wildfires in California is to assess whether difficulties in communications played a role in the spread of the fires and destruction of thousands of homes. Once again, mismatched radio systems often left U.S. Forest Service crews and other responding fire agencies unable to talk to each other.



Some firefighters resorted to palm-size Family Radio Service units after the failure of their regular radios. At times, supervisors had to leave their crews in trucks parked in the field and drive back to their base camp to get instructions because they couldn't reach anyone by radio. Some out-of-town "strike teams" that were supposed to have radios "cloned" to enable them to talk to commanders never got them, or went into action without coordinating their frequencies. Temporary repeaters couldn't be installed on the ridge tops because helicopter pilots couldn't contend with the wind and smoke.

Forest Service fire crews and out-of-town strike teams sometimes tried to talk to each other over old VHF radios. Many agencies have gone to an 800-megahertz system, but others have not. Moreover, some 800 MHz systems are analog while others are digital, and systems from different regions may have a limited number of channels in common.

Combined with overused cellular telephone channels, the ionizing effect of smoke, mountainous terrain, and even cross-border radio interference from Mexico, those factors helped turn firefighting communications into an intermittent nightmare.

For San Diego city firefighters, the problems were more basic: Crews found themselves unable to talk to anyone when their radio batteries went dead, and there were neither fresh replacements nor battery chargers available.

Firefighters weren't the only ones being challenged. Dispatchers were having problems as well. Just as firefighters sometimes couldn't connect their radio networks, computer-driven dispatch systems for different agencies couldn't "talk" to each other, forcing dispatchers to trade information over the phone.

Everyone has their pet solution, of course. The Justice and Treasury departments have a joint project under way called the Public Safety Wireless Network whose goal is "seamless, coordinated and integrated public safety communications" at every level of government. The San Diego Association of Fire Chiefs has its own communications committee looking at the problem. (source: San Diego Union-Tribune)

DC System Good to Go

After a $40 million overhaul, a technology and public safety team has been all over the Washington, DC, area testing the city's new emergency communications system. After visiting scores of nightclubs, apartment buildings, offices and other places where emergency radios previously were apt to cut out, they found major improvement in signal strength and sound quality.

Wi-Fi Gridlock Predicted

In a report entitled "The Urban Wi-Fi Crash of 2004," market researcher Peter Kastner says with 300,000 to 400,000 Wi-Fi access points sold every month, interference in urban Wi-Fi nets is close at hand. Even if you are six feet away from your access point, another system within a "football field-wide sphere" can ruin your wireless Web surfing or work from home.

There's not much help to be had from other flavors of 802.11, either. 802.11b and g technologies suffer potential interference problems from sharing 2.4 GHz spectrum with cordless phones and microwave ovens. 802.11a offers more channels, but the technology is more costly and range suffers beyond 20 feet.

Says Kastner: "The long-term solution is to allocate more bandwidth – and hence more channels – to the 2.4 GHz unlicensed radio band." (*TechWeb News*)

WiFi Fox Hunt?

One man's interference may be another man's entertainment. A couple of techno geeks in New Zealand had an idea to turn the proliferation of WiFi networks into the modern version of a wireless treasure hunt – similar to an amateur radio fox hunt. If you read last month's feature article on "DXing 2.4 MHz," you'll quickly catch the concept:

Each team "war drives" around an area looking for wireless access points. Upon finding an access point they are given a clue (probably in the SSID) of where to find the next access point. The team to find all the access points the fastest wins a prize. Equipment needed include a laptop or portable device that can scan for wireless networks, an antenna that connects to the laptop, a program like Netstumbler or Kismet that can scan for wireless networks, and a map of the area.

The proposed contest was being sponsored by Borg WiFi and NZWireless.org, with plans for a BBQ afterward. Sounds like fun to me!

Radio to the Rescue

Cellular phones are being used everywhere these days, but a lot of folks are discovering they have their limitations. In major traffic tieups, emergency situations, power blackouts, and remote locations out of reach of a cellular tower, a cellular phone is as good as useless.

One man, hunting alligators in the Everglades, had reason to be grateful for his radio when his airboat would not restart. After running his cellphone battery down while troubleshooting the engine problem with a couple of friends, he called for help on his VHF radio, hoping to find other fishermen in the vicinity. What he got was a rescue service called Towboat US. Unfortunately, they couldn't travel in the Everglades at night, but the operator did relay messages to and from the boater and his friends. Using the GPS coordinates he had given them, his friends finally picked him up at 4 am.

Of course, the Coast Guard rescues boaters in distress almost daily – Folks like 14 people fishing near Santa Cruz Island who lost all their navigation instruments in a small fire. Unable to tell where they were, they radioed the Coast Guard, who found them in less than two hours and escorted them to shore.

Rescue by Satellite

Recently, a Cleveland, Ohio, man became the first to be rescued using a personal locator

beacon (PLB). This signal makes use of the Search and Rescue Satellite Aid Tracking System (SARSAT), operated by NOAA. The system has long been used by boats and downed aircraft, but this past summer it was allowed for personal use in the U.S.

Carl Skalak, 55, was in the Adirondack Mountains of Upstate New York when he became disoriented from his camp in frigid weather and activated his PLB. At 10:45 a.m. EST, personnel at the Air Force Rescue Coordination Center (AFRCC), at Langley Air Force Base, Va., were notified of the distress call via the Search and Rescue Satellite Aid Tracking System (SARSAT), operated by NOAA. The AFRCC notified the appropriate state emergency rescue agency in the area where the PLB was activated.

According to Lt. Daniel Karlson, SARSAT operations support officer for NOAA, "The system worked like a gem... In a matter of a few hours, Mr. Skalak might have become acutely hypothermic putting his life at risk. Since he had properly registered his PLB, we were able to immediately confirm his whereabouts and set the wheels in motion for his rescue."

Push to Talk ™

"Push to talk" is a phrase familiar to any user of two-way radio equipment. So it was a real surprise to us to hear that Nextel's bid to trademark the phrase was approved last April. Now Verizon Wireless Inc. has introduced a walkie-talkie service called Push to Talk – a phrase to which Nextel Communications now claims it has exclusive rights. Verizon filed a lawsuit in July, asking the judge to rule that the phrase is generic, and the trademark invalid.

Both companies are using the phrase to describe the mode in which a cellular phone is used as a "walkie-talkie" by pressing a button instead of dialing a number. Sprint is also planning to introduce a similar feature in their PCS unit.

By the way, a new "push to talk" software program called Fast Chat isn't limited to calling phones from the same carrier. As long as the phone is signed up with Fast Chat, a push of a button may connect you to almost any phone, *worldwide*. The software converts your voice into packets of data and transmits them via the same Internet data service which provides text messaging. When the message arrives, the data is converted back into voice by the recipient's Fast Chat software, with only a slight delay.

Tauzin Going Hollywood?!

Louisiana Congressman Billy Tauzin is rumored to be a top candidate to replace Jack Valenti as head of the Motion Picture Association of America. The position with the movie industry's powerful lobbying group comes with a reported one million-dollar annual salary.

When Jack Valenti took the position at MPAA in 1966, he resigned his White House post as Special Assistant to Lyndon Johnson. Reckon Tauzin would quit the House and his position as Chairman of the House Commerce Committee?

The Call of the Wild

Staff at the UK's top spy base in Cheltenham were mystified by a transmission heard across the high frequency bands but which was only picked up by antennas at Scarborough. When the antenna site was staked out, the culprit turned out to be a randy ram which had been rubbing itself against the radio mast every time it mated.

The story was published by the Government Communications Headquarters (GCHQ) as part of a GCHQ recruiting drive. Bob McNally, GCHQ spokesman said, "We cannot talk about what we do often. But we have gone for a wide appeal and have tried to tickle the funny bone."

"Communications" is compiled by editor Rachel Baughn from newsclips and emails submitted by our readers. Hearty thanks to this month's *MT* reporters: Anonymous, NY; Nelson Esteves, FL; Ira Paul, MI; Doug Robertson, CA; Brian Rogers, MI; *via email* - Ed, Jim Hackett, "Hilary", Maryanne Kehoe, Jorge Rodriguez, Keith Russell,Todd Stout, Larry Van Horn, Barry Williams, and Robert Wyman.

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Vacation Monitoring in Croatia

By Michael Jeffreys*

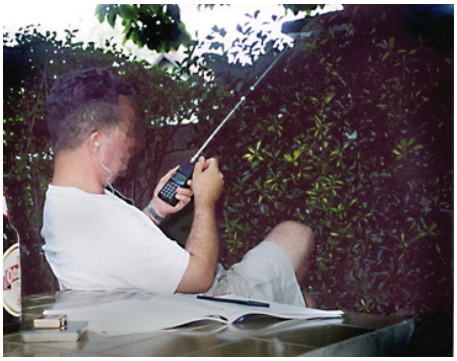
All photographs courtesy of the Author

People love their cell phones in Zagreb, Croatia's capital city. This scene of the main tram stop in the city's center is typical of a busy day in Zagreb's shopping and café district.

Straddling Western Europe and the southern Balkan states, Croatia makes a superb location to monitor not only enthralling local communications of all kinds, but also international signals – shortwave, air traffic, military, maritime, and other utility broadcasts – from some of the world's hottest spots. I did just that on a recent summer vacation to this lovely Adriatic country. The result was spectacular.

A Beautiful European Country Descends into War

Croatia is a fascinating place with its mix of friendly people and wonderful foods, landscapes that range from scenic Alpine mountains to one of the most dramatic seacoasts in Europe. I first visited the country in the 1980s before Croatia and the other Yugoslav republics declared independence and the country descended into civil war.



The author, Michael Jeffreys, monitors Croatia's airwaves with an Icom R10 handheld radio from a plush backyard in Zagreb.

Years later, I returned as a United Nations official during the wars that swept former Yugoslavia. In those years, I was too busy lurching from one crisis to the next to do much serious radio listening, a hobby of mine since childhood. As a result, I have very few notes of what I heard – and there was a lot to hear – during those turbulent times.

Wartime Monitoring Turns to Vacation Monitoring

Since the war, I had wanted to spend some time documenting what exists across Croatia's airwaves. My curiosity had been piqued when I mistakenly walked into a clandestine, but not terribly well secured U.S. Government monitoring office during the war. It was filled with Icom and Watkins-Johnson radios and I learned that the area had, for some reason unknown, near-perfect atmospherics, making it strategically situated to receive signals from not only all over Europe, but also North Africa, the Middle East, Central Asia, and beyond.

There is another link between Croatia and radio: Nikola Tesla. The history of radio – and our ability to use electricity – owes a major debt to this native son of Croatia. In 1856, Tesla was born in the Croatian town of Smiljan, which was then part of the Austro-Hungarian Empire. He showed a genius for electrical engineering, discovering alternating current (AC) and going on to invent a system of generators, motors, and transformers that made the transmission of electricity possible.

Tesla moved to the United States in 1884 (he held more than 40 U.S. patents) and worked with Thomas Edison until the two became rivals. Tesla is also known for his work on wireless communication, and he designed systems that foresaw our world of international radio communications, fax machines, and radar-guided missiles and aircraft.

So, radio and Croatia were firmly established in my mind. I had met my future wife in Zagreb, the country's capital, during the war, and we now return year after year to visit her family and our friends. I promised myself that one day I would take a crack at monitoring from Croatia. Finally, I had enough time – and the right equipment – to do so.

With a newly acquired Icom R10 handheld receiver and a series of antennas – rubber duckies, whips and homemade long-wires – my summer vacation, which was usually spent enjoying time with family, friends, and sampling the good food and wines of Croatia, was transformed into a radio

The historical Upper Town in beautiful storybook Zagreb with St. Marks church, which dates from 1841. The city was founded 900 years ago.

monitor's delight.

The R10 is the perfect radio for this sort of thing. Its wide frequency range and compact size make it easy to use almost anywhere. But in these times of heightened security, I was careful not to be conspicuous pulling out the R10 just anywhere. My mother-in-law was a little worried when I set up my portable "shack" in her backyard on the outskirts of Zagreb, and rightly so, as no one had any idea of what monitoring laws existed in the country or even if the R10 was legal there!

Nonetheless, I monitored.

I had brought no documentation to help me locate or identify frequencies other than the current issue of *Monitoring Times*. I also relied on my knowledge of the bands and – so important in making monitoring a success – good, old-fashioned luck.

A Sky Full of Aircraft – And Radio Waves

My first full morning of listening – which was carried out while recovering from jet lag – consisted of scanning the air traffic bands, and what a success it was. On frequencies between 118 MHz and 135 MHz, I heard air fields and control towers from such European cities as Vienna and Gratz in Austria, Banja Luka, Tuzla and Sarajevo in Bosnia, Brindisi and Padua in Italy, Slovenia's capital Ljubljana, Serbia's Belgrade, and Split, Dubrovnik, Pula and, of course, Zagreb, in Croatia. Some of these places were considerable distances from my backyard listening post in Zagreb, but I received them ably with the R10.

If that list of cities was impressive, the number of air carriers I noted was astounding: Air France, Swiss International, Austrian Airlines, KLM (Netherlands), Olympic (Greece), Turkish Air, Adria Airlines (Slovenia), Lufthansa (Germany), Jet Set, Condor, Star Way, Martin Air, Tyrolean, Alitalia (Italy) Ukraine International, Lot (Poland), Cyprus Air, Czech Airways, and Croatian Airlines. All of this is testimony to the diversity of nations represented in the region, a place that is truly the crossroads where East meets West.

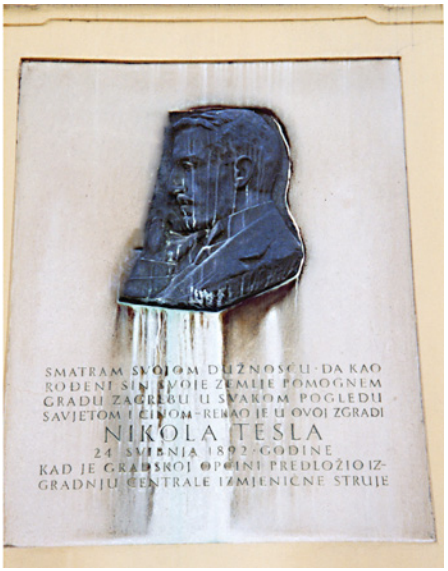
I heard one commercial aircraft declare an emergency at 18,000 feet, reporting that it was going on to Vienna for an emergency landing. In addition, there was someone with an American accent identifying his aircraft as "Jay Go 88 Delta." I found an automated broadcast of aero conditions for central Europe on 127.800 MHz.

Air traffic was not the only signal type readily receivable in Zagreb, a city of a million people. Police calls, cellular traffic and cordless phones were all quite active – at all hours – at my location. The police use a non-trunked system in and around the 162 MHz–164 MHz range; and they use cellular phones as well. Zagreb's main emergency dispatch frequency appears to be 162.950 MHz, and the system seems to be much less formal than those in major American cities. The R10's real-time band scope was particularly useful in hunting down these transmissions.

What Are They All Talking About?

Cordless phones and baby monitors I found between 40.685 MHz and 46.765 MHz. Many cellular phones in Zagreb appear to inhabit frequencies between 422.125 MHz and 425.700 MHz, although I also heard traffic that seemed like cellular calls around 145 MHz and 851 MHz. In these cases, the roof of a high-rise apartment provided excellent coverage – and a dramatic view – of the city.

In Zagreb, a romantic city where one still hears church bells toll late into the night and fashionable couples spend hours smoking and sipping dark, strong coffee in cafes, people love their cell phones – or "mobitels" as they call them. I noted one handsome young man



Croatia's native son, Nikola Tesla, honored on this plaque in Zagreb, not only discovered AC power, but also paved the way for international wireless communications as we know it.

This ministry in downtown Zagreb, two blocks from the author's wartime home, was bombed by Serb forces in 1995. Note the communications equipment on the building's roof. Many official buildings in the city have such notable arrays on their roofs.

maneuvering his motor scooter through the crowded streets while talking on his mobitel, no easy feat. The sheer number of chic women in tight slacks and stiletto heels managing the cobblestone sidewalks while talking on tiny mobitels, arms laden with an assortment of shopping bags, was astonishing.

And what are they all talking about? Pretty much everything you can image fills Zagreb's airwaves: Explicit phone-sex in English; reports of a Macedonian run over twice by a truck; someone "beautiful and free" available at a local "spa"; a call to a mental hospital about a "festering wound" and "one and a half fingers"; an apologetic woman calling her dentist to follow up on a tooth filling after ten years; a frantic call concerning a man, obviously demented after years of war, who was threatening his family; and one memorable – and quite long – discussion of "two years of marriage problems."

Having more or less exhausted the VHF/UHF bands, I moved on to HF – and in Croatia there is no shortage of signals in that spectrum. Again, the R10 proved its versatility in allowing me to easily monitor the shortwave bands; my homebrew antennas also proved effective in pulling in faint signals – both utility and broadcast – from literally around the globe.

The Shortwave Bands are Alive with the Sound of...

Daytime monitoring of the shortwave broadcast bands provided an array of international broadcasters. The BBC's North American Service was clearly audible on 17.640 MHz at 09:55 GMT. (Zagreb is 2 hours ahead of GMT.) Kol Israel in Hebrew was very strong on 17.530 at 10:00 GMT, as

A police office in Zagreb is housed in a handsome Austro-Hungarian-era building. Note the array on the roof and the long-wire antennas hung between buildings.

was Radio Pakistan in English on 17.520 MHz, with a parallel transmission on 21.470 MHz. I noted three different Arabic language stations at 10:20 GMT on 21.600 MHz, 21.700 MHz, and 15.150 MHz, the latter broadcast featured a chanting of the Koran and Muslim prayers.

Radio Free Europe in Bulgarian came booming in at 10:25 GMT on 15.120 MHz, and Radio France International was also quite strong at that time on 15.300 MHz. There appeared to be another service of Radio France International providing soccer scores on 15.640 MHz. Also broadcasting the latest soccer standings was Radio Spain on 15.585 MHz.

There were several very strong stations that I was unable to identify, including one which broadcast English language business phrase lessons in Russian on15.335 MHz at 10:35 GMT. ("Time is money" and "Shake hands" were some of the terms being taught.) On 21.595 MHz at about the same time was a program advocating that "the West understand Islam." It featured an announcer speaking in accented-English of the "legacy of Islam, glorious culture." And on 6.090 MHz at 10:40 GMT there was financial news broadcast in German.

If daytime monitoring proved fruitful, the evening hours were a bumper crop of international broadcasters. I monitored the following stations on several nights between 19:00 and 20:30 GMT:

Vatican Radio in French (4.005 MHz, with parallel broadcasts on 5.885 MHz and 7.250 MHz); Radio Ukraine (5.900 MHz); Radio Canada International (5.990 MHz); BBC Serbian Language Service (6010 MHz); RAI International from Italy (6.120 MHz); Radio Free Europe's South Slavic Service (6.130 MHz); Radio Austria International (6.150 MHz); Deutsche Welle (7.190 MHz); Radio Belarus (7.105 MHz); and Radio Albania (7.240 MHz).

There was a Voice of America "Special English" program (7.260 MHz); Voice of Russia, which also announced itself as "Radio Moscow," in English (7.440 MHz); Turkey (9.750 MHz); Radio Bulgaria in English (9.395 MHz); Romania (9.565 MHz); Medi 1, a Franco-Arabic station broadcasting from Tangier, Morocco (9.575 MHz); China Radio International (9.725 MHz); Egypt (9.900 MHz); an Esperanto language program (9.965 MHz); Radio Belgium in English (9.925 MHz); Radio Australia (12.625 MHz);Nigeria (15.125 MHz); and Radio Exterior de España (15.380 MHz).

And there were scores of other stations that I simply could not identify.

A station on 15.760 MHz (with a parallel broadcast in the 16 meter band), which I believe emanated from Israel, stood out as one of the oddest. It simply played melancholy music all night long with no announcements except for news in Hebrew on the hour and half-hour. The songs varied from the 1940s-style "Be My Little Gypsy Tonight" to the joint rendering of "Unforgettable" by Nat King Cole and his daughter, Natalie. One can only imagine that with all the traumatic events unfolding in the Middle East, the programming must have been designed to calm and soothe its intended audience.

The author's young translators, with faces obscured, listen from a rooftop in Zagreb that not only offered unparallel reception, but also an outstanding view.

Calling All Ships, Spies, Planes, and Peacekeepers

There is more, of course, to the HF bands than international broadcasters, and the utility traffic I monitored in Zagreb was as varied as it was interesting.

During the late evening hours (generally between 21:00-22:00 GMT), I monitored a range of utilities, all in upper-sideband: US Strategic Command "Sky King" transmissions (8.992 MHz, parallel 11.243 MHz); Royal Air Force aero weather information (11.252 MHz); Tripoli aero (11.300 MHz); Gardina Radio calling "all ships" (8.787 MHz); and a series of ship-to-ship and ship-to-shore transmissions in French, Russian, Italian and Macedonian (8.757 MHz and 8.763 MHz).

The cold war may be over, but I am happy to report that so-called "numbers stations" – those supposed espionage transmissions to deep-cover spies – are alive and well and easily receivable on shortwave in the Balkans. I heard two British numbers stations with female announcers on 5.745 MHz

The old United States Embassy in Zagreb, with its communication equipment clearly visible on the roof, was the scene of much action during the wars that engulfed former Yugoslavia in the 1990s.

Trg Bana Jelacica (Jelacic Square) is the heart and soul of Zagreb. It is named after the Croatian hero and viceroy who defeated the Hungarians in an uprising in 1848. It is the city's main gathering point for young and old alike.

and 6.959 MHz; Israeli Mossad stations were evident on 2.844 MHz (call YHF) and 6.745 MHz (call CIO); and American numbers broadcasts came in clearly on 6.824 MHz and 10.527 MHz, again transmitting with automated female voices.

NATO peacekeeping communications were sporadic, as tensions in the region have subsided, but frequencies I noted were 2.840 MHz, 6.723 MHz, 11.111 MHz, and 14.511 MHz. I also received two U.S. Military VIP flight transmissions, known as Special Air Missions or SAM, on 11.217 MHz and 15.043 MHz. All these appeared to be routine communications, a jumble of phonetic-alphabet code words.

Bedtime: Sweet Dreams in Zagreb

When it was time to actually get some shuteye, I turned on an old Savica, a domestic radio produced during the Tito era, that my mother-in-law keeps in our bedroom. Its dial glowed and MW transmissions – many sounding as if they had not changed in decades – came through its speaker with a deep, resonant sound as only MW broadcasts heard on a tubes-and-wood radio can.

I drifted off to sleep listening to concertos from Hungary, opera from Germany, an arts program from the Czech Republic, lively game shows from Italy, folk songs from Croatia's MW external service on the Adriatic coast, and somber news from Belgrade and Sarajevo – there was even America's own Armed Forces Network broadcasting National Public Radio's Morning Edition on 873 kHz.

The fading of the radio waves across the ether and the mixing of various faraway stations into a melodic heterodyne made them sound all the more romantic.

And I wasn't dreaming: In Zagreb, I really was in radio heaven.

** Michael Jeffreys, who used a pseudonym for this article, lives in California. He was an official with the United Nations Department of Peacekeeping Operations.*

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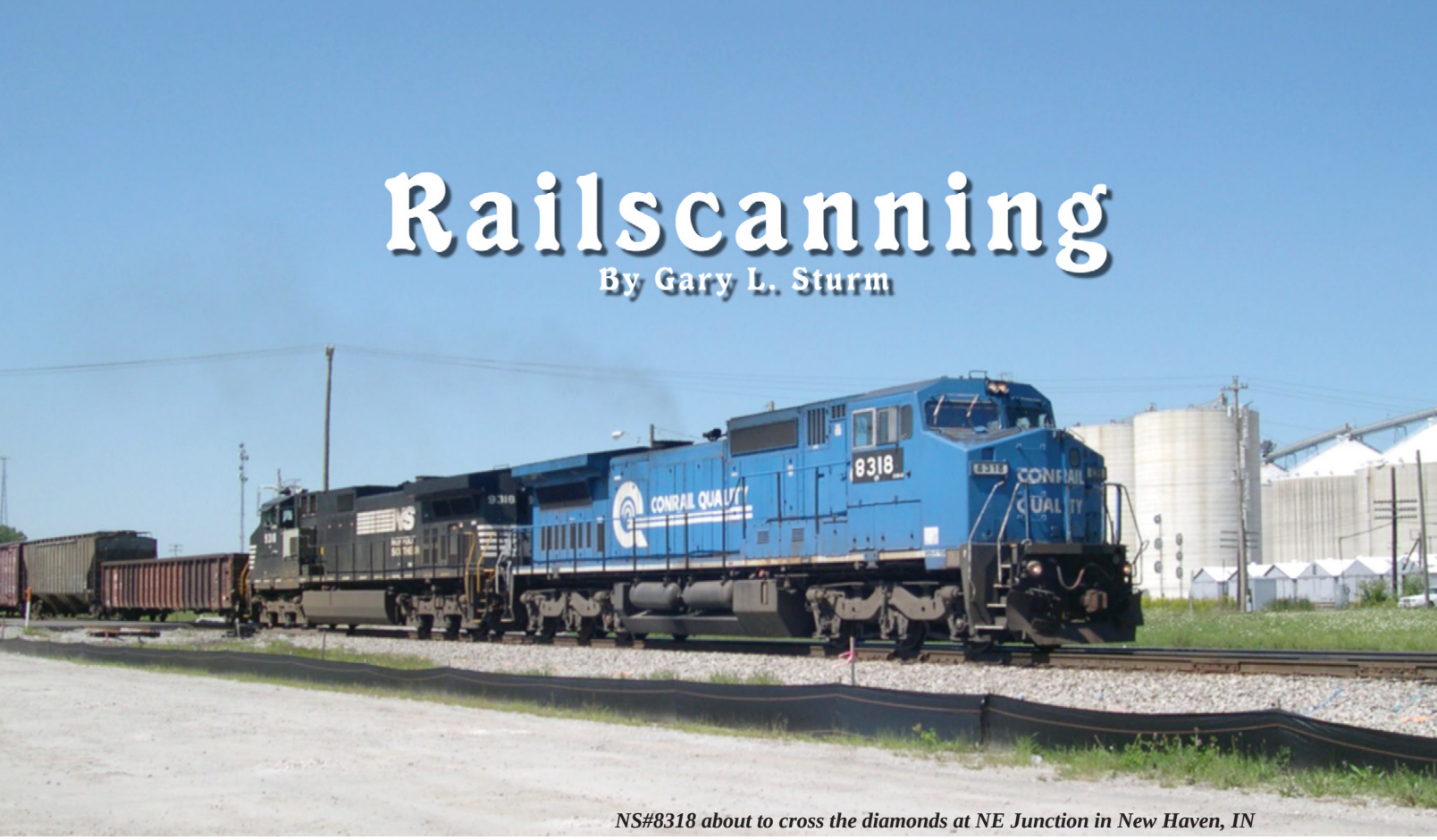
Railscanning

By Gary L. Sturm



NS#8318 about to cross the diamonds at NE Junction in New Haven, IN

I confess I am a *Ferroequinologist*. What on earth is that?! Well, it's nothing to be ashamed of – It is a person who studies the Iron Horse, i.e. trains. Today we are called *railfans*.

Railfans do a number of things. For the most part, they love to watch trains rumble down the steel rails. They also photograph locomotives and rail cars, keep records of serial numbers of the locomotives and cars, study railroads for their own model railroad operations, and monitor their movements via a radio scanner for photography or pure enjoyment.

Why listen to trains?

Many people dislike trains. They are big, slow-moving behemoths that are a mile long and block crossings for what seems like hours. Trains have great mass and require a long distance to speed up and also to stop! I hate being caught by a train at a crossing, too, unless I have my camera with me. But trains don't always roll along at 20 miles per hour. My wife and I have paced a Union Pacific train in Nebraska at 85 mph, only to have a faster, expedited train catch up from behind and be routed around the slower train!

Do you ever wonder why some trains travel slowly and sometimes stop for a lengthy time and cannot move? Try listening in to the conversations the engineer and conductor have with the train dispatcher. The train may have blown or ruptured the air brake hose which connects one car to the one behind. The train may be a mile long and the conductor will have to walk the whole train to find the cause for the loss of the air brakes. Listening in to their conversations will tune you in to daily problems on the railroads. Many times pranksters or vandals shut off the air brake angle cocks on the cars. Then the engineer in the lead locomotive cannot release the air brakes. I have heard the railroad's special agents and local police being called to investigate this type of vandalism.

The United States Congress created the legislation founding the railway special agents in 1847. The James Gang had gotten to be a little too much for the railroads to handle without a police force. Pinkerton agents were among the first railroad cops.

Each state has ordinances, which create and empower the railway police as peace officers. Their power varies from state to state, but a railroad policeman may have police commissions in several states with powers like a federal agent. Many railroads have their own police department consisting of one or many special agents.

Many railroads use the standard Association of American Railroads (AAR) allocated radio frequency of 161.205 MHz for their communications. I have heard the railway police assisting the municipal cops with robberies, calling the INS about illegal aliens, and investigating railroad crossing accidents and deaths. These are but a few examples of the interesting listening opportunities that can be yours by adding the railroads to your municipal police and fire department monitoring.

History is part of the sport

Railfans enjoy studying the different parts of a train. Part of their fascination includes studying the development of the railroad. For example, many have studied the caboose, the last car in a train that has carried conductors and rear brakemen since the mid-1800s. Others are fascinated with the interlocking machine for controlling movements of one rail line across another at a junction, a development that has been around since the late 1800s.

Towers were erected at junctions, control points and interlockings to house the interlocking machine. They were normally manned around the clock by railroad employees. The tower employee was one source of information for the railfan about approaching trains since the towers were connected to the train dispatching office by telegraph. The conductor and rear brakemen were also sources for knowing what other rail traffic was moving when they were stopped at a junction.

Today, most of this country's interlocking towers have been removed and replaced by remote systems, which now control these train movements. Dispatchers in Jacksonville, Florida, control most of the CSX Railroad in the east, and the Union Pacific Railroad controls its routes to the West from Omaha, Nebraska.

Gone with the caboose

Cabooses have been mostly replaced on mainline trains in the past twenty-five years with the introduction of the electronic EOT (End of Train detector). The EOT monitors rear-end brake pressure and sends a radio signal to the lead locomotive, which has a receiver that displays this reading. Thus, the caboose is no longer required. However, some railfans still monitor the radio signal from the EOT to know when a train is in the area.

Train crews used to consist of engineers, firemen, conductors, head-end brakemen and rear-end brakemen. In addition, many states required a third

person in the caboose, making a crew of five or six the norm.

Today's trains operate with two men in the locomotive, i.e. the engineer and the conductor. The advent of radio controlled locomotives has even led to only one man running a train! Remote control engines are normally used today for switching within yard limits with limited road usage.

The first railfans

Early day railfans would ride in their carriages to the nearest railway crossing. Here they would stop, look to their left and then to the right. If nothing were in sight, they would assume a train had just passed because they could see its tracks. (Ha! Just a little Hoosier corn humor!)

Years ago steam locomotives were the dominant motive power for trains. Friction bearings on each freight car axle required a high tractive force to start a train moving with a steamer, which had limited low speed traction. Thus, trains were limited in length and resulted in more trains traveling the rails at one time than are seen today.

A smart way of finding today's infrequent train movements is through the use of a radio scanner. I know, because I have used radios since 1971 to listen to the railroad crews and their daily activities.

Scanners and me

The first radio I used wasn't even a scanner. It was an old Radio Shack Patrolman tunable police band and AM radio that I got from Mom while I was studying Mechanical Engineering at Purdue University in West Lafayette, Indiana.

I was a member of the Purdue Model Railroad Club and when the Student Union closed down at 1 a.m. on weekends we would chase trains on the Penn Central, Norfolk & Western, and Indiana's own Monon Railroad, which was called the Hoosier Line.

I remember being so happy when I finally tuned that old Patrolman onto the road channel for the Monon Railroad and heard a switching crew with a dead engine out on the main blocking traffic and calling for help!

My home was in Elkhart, Indiana, and I lived near the huge Penn Central Robert Young classification yard. It was 1972 and I tried to use the old Patrolman, but to little avail. There were too many channels to listen to. I was in the local electronic store and found my first four-channel handheld scanner. The store even had a few of the Penn Central radio channels posted and supplied me with the necessary crystals.

A railroad buddy took me to the radio shop at Robert Young Yard and I saw all the yard's radio channels and their uses scribbled in pencil by the radio maintainer on the wall. I was in heaven!

I bought two Heath 8-channel scanner kits with the intention of using them both for monitoring the rail yard. The kits were expensive and it cost a small fortune for crystals, since one was required for each frequency.

Next I purchased a Regency WHAMMO base scanner. The WHAMMO had ten channels and used programmable channel elements called combs. The programming elements looked like a comb for your hair and the teeth were removed to program each comb for a unique frequency. They plugged into a rack on the back of the scanner.

Then in 1978 came the Bearcat 250, which had 30 channels and it was all programmable by keyboard strokes. It was an expensive radio for the time, but it saved the cost of buying crystals. I also purchased a Regency M400 with 30 channels around 1983. It was also fully programmable and had a backlit keyboard for mobile use.

Railfanning in Elkhart, Indiana

Elkhart was a great place to watch trains. The Elkhart Amtrak Station offered benches to sit on to wait for the trains. Railfans used to wait for train movements and chat about what they had seen roll by in the past few days.

Norfolk Southern train 11E at Grabill, IN

In 1984, I worked with Regency on getting a review radio for an article in *Extra 2200 South* magazine. I used it thereafter for writing railscanning articles. This handheld HX-1000, 30-channel programmable unit remained my favorite for years. It had great signal reception and intermod rejection like no other scanner I have ever owned.

I still have this radio which is in good working condition. I have had to replace the NiCad battery pack many times due to its extensive use. It is, however, retired now. I have owned and sold many other scanners, since I bought that HX-1000, but I was never quite satisfied with their performance.

My radio equipment today

Today I use two scanners at home: an old AOR-2515 with some audio problems and a Radio Shack PRO-2050 TrunkTracker. The scanners are connected to a Hamtronics filter-signal amplifier to a 2-meter Ventenna atop our sewer vent. It is a great stealth antenna, but has no signal gain to it.

The mainstay today for railscanning at home is my Yaesu FT-1500 2-meter mobile transceiver. We live at one of the highest points in Allen County, Indiana, and the radio is connected to a Diamond F-23A 2-meter vertical gain antenna with the tip at 30 feet. This is a ham radio antenna, which is electrically tuned to the 2-meter amateur frequencies. I can receive the South Shore dispatcher from Michigan City to the west and the Indiana & Ohio Railway dispatcher from Lima, Ohio, to the east. The FT-1500 serves double service as both a ham radio and also my railroad radio.

How I railfan

I railfan in a Chevy Venture van with two antennas. One is tuned to the 160-161 MHz railroad band. The other is a pre-tuned 2-meter ham antenna. I carry a Motorola Radius GM300 16-channel scanning radio to monitor the railroads. The radio shop I purchased it from programmed it to receive only channels I wished to monitor locally. Many railroad trainmasters and maintenance workers use the GM300.

I have a new Vertex-Standard VX-150 handheld in the van, too, and also use it as my portable. The VX-150 is a 2-meter ham radio and receives as well as the Regency HX-1000. It has few intermod problems. I use it in the van with a Comet 2-meter whip antenna. The VX-150 is about one-fourth the size and weight of the venerable old HX-1000. I scan all local channels with the Motorola and monitor the Norfolk Southern's terminal channel with the VX-150, so I do not miss any action.

Through the years I have owned various types of scanners from Bearcat, Channel Master, Heath, Radio Shack, Regency and Relm. I received my ham license in 1988 and progressed to be an Extra Class amateur a few years ago. My radio funds are limited so I look for radios which can do double duty as ham radio and railscanner, too.

Monitoring the Road Channel

The railroads have what is called a "Road" channel which may vary from frequency to fre-

Fury #7288, Ex-Burlington Santa Fe engine at New Haven, IN

quency on different portions of a railroad's mainlines. Most railroads use radio channels in the 160-161 MHz VHF, or very high frequency, range. VHF communications are line-of-sight transmissions: The signals normally do not bend with the curvature of the earth. Thus, the same railroad radio frequencies can be used at different locations across the U.S. and Canada with little interference.

A railroad's trains communicate with each other and the dispatcher via the road channel. For example, the Norfolk Southern railroad and the CSX Transportation Company crews will call-out the current aspect of the train signals as they pass, which is recorded in case of an accident. Doing this also makes the train crews more aware of what the signal actually shows.

Remember the caboose and its crew? Now trackside detectors check for overheated bearings or hot boxes, and for dragging equipment. These detectors broadcast to the lead engine on the road channel that a defect has occurred. The train will then stop and the crew has to inspect the train before traveling on.

I monitor the road channel so I know when a train is coming. This allows me the time to prepare to photograph the train. At home I listen for entertainment and to learn how the railroads function. I am building a new model railroad in my basement and can use the road and dispatching lingo I hear on my radios for actual H.O. scale train operations.

Railroads also have distinct dispatcher channels, such as on the CSX Railroad, along with maintenance of way and mobile telephone channels. Railroad yards may have a general yard channel, switching channels, repeater frequencies for the car department or the diesel house, and many other frequencies.

Norfolk Southern, Ex-Conrail engine at New Haven, IN

Stayed tuned for more!

If you want to know more about railroads and what to listen to on their radio channels, stay tuned for the new *"Boats, Planes and Trains"* series of articles presented in *Monitoring Times* monthly. Each month a different aspect of monitoring boats, planes and trains will be published with each distinct column appearing in sequence.

We have just touched on the basics of listening to the railroads and what can be heard. The railroads have many uses for the radio frequencies for which they hold licenses.

I invite you to send verified lists of the railroad frequencies you monitor from your location for publication in *Monitoring Times*. Send to garysturm@monitoringtimes.com or via snail mail in care of *Monitoring Times*. I have listed the railroad radio frequencies I monitor daily in Table 1 as an example. See you again in April!

Table 1: RR Radio Frequencies

Fort Wayne, Indiana

Chicago, South Shore & South Bend:
- 161.010 Dispatcher Repeater
- 161.355 Road and Dispatcher

Canadian National:
- 160.530 - Road and Dispatcher (South Bend, Indiana)

CSX Transportation:
- 160.230 Road
- 160.290 Dispatcher
- 160.320 Switching - Garrett Yard
- 160.530 Switching - Garrett yard
- 160.785 Maintenance of Way
- 160.800 Road - Adams Tower to Decatur, Indiana
- 160.890 PBX - Duplex
- 161.070 Road - Adams Tower east
- 161.160 Yard - Garrett Yardmaster
- 161.370 Dispatcher
- 161.415 PBX - Duplex
- 161.520 Dispatcher

Indiana Northeastern:
- 161.100 General Operations

Indiana and Ohio Railway
- 161.220 Road and Dispatcher

Maumee and Western:
- 160.695 General Operations

Norfolk Southern:
- 151.865 - Triple Crown Intermodal Yard
- 160.380 - Road and Terminal
- 160.440 - Road: South of Fort Wayne
- 160.515 - Area Radio Network (PBX)
- 160.800 - Road (ex-Conrail Line through Butler, Indiana)
- 160.950 - Piqua Yard
- 161.070 - Road: Marion Branch (ex-Conrail line through Warsaw, Indiana)
- 161.190 - East Wayne Yard
- 161.205 - Special Agents
- 161.250 - Road: East of Dawkins Siding
- 161.490 - Road: West to Chicago

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Myth Busting

By Tomas Hood, NW7US
tomashood@monitoringtimes.com

I often hear colorful remarks regarding space weather and propagation while listening in on radio conversations. I've heard comments that, "The solar flare will hit us sometime later today," or, "the sun exploded yesterday, so the bands are dead today." Some speculate that the recent historical flare activity seen in October and November of 2003 is evidence that the sun is about to explode or will go crazy and destroy the Earth.

One radio talk show host interviewed a guest who proclaimed that the big flare of November was a "warning shot" and we should be prepared for greater flares than ever seen. Is it normal to see high levels of activity as well as major flares like that of November 4 during the declining years of a solar cycle?

To begin putting recent space weather into perspective, let's begin by looking at what a solar flare is. How does a solar flare affect radio propagation? Is it typical for us to see such strong flares like the one on November 4, 2003?

Anatomy of a Flare

Solar flares are the biggest explosions in our solar system, and they originate in the atmosphere around the sun. Solar flares are regions in the sun's atmosphere of exceptionally high brightness and temperature, occurring near sunspots. They are made of high-temperature plasma gas that leaps into life after quiet periods ranging from days to months. They explode rapidly, taking only minutes or hours to peak.

When a flare occurs, it has three stages. The first is the precursor stage when the magnetic energy creating the flare is triggered. During the precursor stage, we see soft x-ray emissions. Soft x-rays are simply defined as weak energy level x-ray emissions.

After the precursor stage, protons and electrons are accelerated to very high levels of energy. This is the impulsive stage, and radio waves, hard x-rays (very high energy x-rays), and gamma rays are produced.

The gradual buildup and then decay of soft x-ray emissions are then detected during the final decay stage. All of these stages can take place in mere seconds, or over longer periods of hours.

Atmospheres are generally the outermost gaseous layers of a planet, natural satellite, or star. It takes a lot of gravity for one of these bodies to retain an atmosphere. The sun has several layers in its atmosphere, just as the Earth has its troposphere and ionosphere. Three of the sun's layers are the photosphere, chromosphere, and the corona. Solar flares extend away from the sun out to the corona layer, the outermost atmospheric layer of the sun that consists mostly of highly rarified gas. This gas is at least a few million degrees Kelvin. Inside a flare, temperatures reach anywhere between 10 million to 100 million degrees Kelvin.

Flares are the result of strong magnetic reconnections. Reconnection is the process of magnetic fields breaking and reconnecting. Oppositely directed magnetic field lines are brought back together into a strong eddy, which physically pushes away gas and plasma. Magnetic energy is converted into kinetic and thermal energy, and released into space in a giant expulsion.

The frequency of solar flares follows the eleven-year sunspot cycle. When the solar cycle is at minimum, active regions are small and rare and very few solar flares occur. As the solar cycle starts to become more active we see an increase of flares, some of which can be quite strong. After the solar maximum, during the decline phase of the cycle, flare activity declines. But it is common to see occasional strong flare periods as the sun settles down.

The Impact on Earth

The intense X-ray energy from a solar flare takes about eight minutes to arrive at our Earth. This radiation then increases the ionization of the various layers of our ionosphere, the most noticeable being the D layer. The D layer tends to absorb radio wave energy. The more ionized, the higher the frequencies absorbed, and the stronger the absorption of the lower frequencies. Very large energy solar flares can shut down all HF propagation for anywhere from a few minutes to several hours. These radio blackouts occur eight minutes after the solar flare, and only affect the sunlit side of the ionosphere.

When folks say that "a solar flare is on its way and will hit us later today," they are probably talking about something other than a solar flare. Solar flares cause sudden changes in propagation almost instantly. If a solar flare had just occurred, chances are communications on HF will have degraded right away. But, is there any solar event that might take a while to affect the propagation of radio waves?

As the sun rotates, very strong magnetic fields are generated. Sometimes, they become highly twisted and complex, and expand away from the sun. Some of the sun's plasma is dragged along these magnetic field lines as they expand away from the sun. We see this plasma flowing along these magnetic fields lines creating an arch.

When the magnetic field lines stretch farther out from the sun, plasma is carried farther away from the sun's gravitational pull. This can cause the plasma to break away and fly out into space. One such solar event that causes plasma to escape and fly out into the solar wind is the coronal mass ejection (CME). CME activity is typically seen at the same time as a solar flare.

The plasma clouds ejected by a CME ride the solar wind and carry with them some of the magnetic energy of the sun. Magnetic energy is always present in the solar wind, and is called the Interplanetary Magnetic Field (IMF). As the Earth moves through the solar wind stream, the Earth's magnetosphere is compressed under the pressure of the solar wind particles. If the IMF is oriented northward, the magnetosphere remains stable. But, if the IMF is oriented southward, it can cause the geomagnetic field to become unstable and active. The plasma cloud that is expelled during a CME increases the strength of the IMF.

It can take anywhere from a day to three days for a plasma ejection to arrive. When a plasma cloud arrives on the solar wind, it further presses on the magnetosphere, causing a shock wave. If the IMF is aligned southward, it combines with the Earth's magnetic field, and opens a window through which the solar particles and plasma can enter our upper atmosphere. These particles rain down, interacting with atoms. This can cause electrons to break away from oxygen, nitrogen, and other gas atoms, creating photon energy, which we see as the aurora.

The effect on radio propagation of a coronal mass ejection is the disturbance on the geomagnetic field. When the IMF is oriented southward, and combines with the Earth's magnetic field lines, it causes a lot of fluctuations. The more active the geomagnetic fields become, the greater the disturbance recorded. We report this

activity using two indexes. One is the K-index, often reported as the planetary K index (Kp). The second is the A-index, often reported as the planetary A index (Ap). The Kp is reported every three hours and indicates current geomagnetic activity. The higher the K index, the more active the geomagnetic field.

When these active and fluctuating geomagnetic field lines interact with the ionosphere, they can cause a recombination of the electrons with nearby atoms. This causes the decrease in ionization, and therefore the lowering of the maximum frequency that can be refracted from that region of the ionosphere. This is called an ionospheric storm, and can last for several days, depending on the severity and duration of the geomagnetic storminess.

To summarize, a solar flare causes almost immediate degradation of shortwave radio signal propagation. This degradation is strongest at the lower end of the high frequency spectrum. The stronger the X-ray radiation from a flare, the higher the frequencies that are affected, because of the way the D layer absorbs radio wave energy.

A coronal mass ejection, on the other hand, takes a while to get here. When the plasma cloud arrives, anywhere from a day to three days after the CME, it can cause geomagnetic storminess, and aurora. Geomagnetic activity tends to cause a decrease in ionization, and a degradation of radio signal propagation. When you hear someone say, "The solar flare from this morning will arrive later," you now know that it is probably a coronal mass ejection that will arrive later, and that the solar flare probably already caused some radio blackouts when it first occurred.

Propagation during January, February and March

As we move away from the Winter Solstice, the day when the Northern Hemisphere experiences the longest daily period of darkness, we begin to see the hours of daylight increase. But, for now, the long nights continue to provide plenty of time for the ionosphere to settle down and the maximum usable frequencies to fall. Daytime openings on the higher bands are short, while most of these higher frequencies are useless during the night.

Propagation on 31 through 19 meters between North America and Europe in the morning, and between North America and Asia during the late afternoon hours, is strong and stable. Nineteen and 22 meters are probably the best daytime DX band, opening for DX just before sunrise and remaining open from all directions during the day. Nighttime openings on these bands become weak to non-existent.

Thirty-one meters is now the best band for medium distance (400 to 1200 miles) reception during the daylight hours, with longer distance reception (beyond 3000 miles) possible for an hour or two after local sunrise, and again during the late afternoon and early evening. Forty-one meters provides medium distance daytime reception ranging between 400 and 1200 miles, and beyond 3000 miles during the hours of darkness until two to three hours after local sunrise.

Seventy-five through 120 meters continue to be stable. Expect strong, stable nighttime DX conditions. Look for Europe and Africa around sunset until the middle of the night, and then Asia, the Pacific, and the South Pacific as morning approaches.

Propagation for signals below 120 meters is at their seasonal peak during this period. Tropical and regional stations are strong late night and through early morning hours. Medium wave (MW) conditions are excellent. D layer absorption is at the lowest level due to the long hours of darkness. If the solar activity has been high, exciting but often short-lived openings of over 3000 miles might occur, due to the higher ionization of the E and F layers. While the long hours of darkness will lower the MUF, MW falls well below that frequency, and might well propagate over such long distances.

Write Me

Thank you to each of you who have written me already regarding my first column. I appreciate the feedback you have offered. I'll take your questions and create answers that I will share in this column. Please write me an e-mail message or a letter. I invite you to check out my propagation resource center on the Internet at **http://prop.hfradio.org**. If you have a cellphone or other handheld device capable of reading WML, I have a WAP version of this resource center at **http://wap.hfradio.org**. You can even sign up for my propagation eAlert service for free. These propagation eAlerts keep you informed of the various index numbers, in real-time. Happy hunting those signals!

73 de NW7US, Tomas Hood (AAM0EWA)
tomashood@monitoringtimescom

Solar History in the Making

A flash of bright light, and history was made. On November 4, 2003, a very bright flash of light announced the eruption of the most powerful flare ever recorded in observational history. For over eleven minutes, this massive flare saturated the X-ray detection instruments aboard several monitoring satellites. It took a few days to assess just how big it really was.

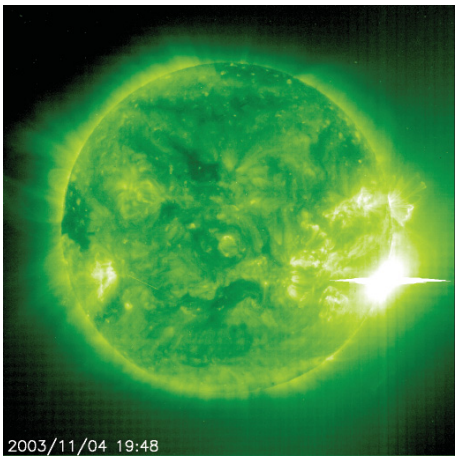
I spoke with Christopher Balch from the Space Environment Center, NOAA, regarding this super flare. He explained that the scientists and engineers who designed the original sensor equipment back in the 1970s had misjudged how large flares could be, and their original sensors experienced flares that caused saturation on a regular basis. They redesigned their instruments to handle much larger flares, thinking that their new maximum would be enough. This time, it was not.

Flares are categorized by assigning a letter followed by a number, which tells us the specific intensity of the flare. X-ray flare intensity is measured in units of power per area or Watts per meters squared. Each letter (A, B, C, M or X) represents a certain numeric value, and the numbers following the letter in the flare classification multiply that value. The numeric values of the letter classes are:

A = 1.0x10E-8 (W m-2)
B = 1.0x10E-7 (W m-2)
C = 1.0x10E-6 (W m-2)
M = 1.0x10E-5 (W m-2)
X = 1.0x10E-4 (W m-2)
(The "W m-2" means Watts per square meter)

To determine the exact intensity of the flare you multiply the number in the x-ray classification of that flare by the value of its class listed above. The sensors became saturated at X17.4, and for the next eleven minutes, stayed pegged.

Christopher and other scientists began comparing many images and raw sensor data. Using mathematical tools they modeled the most likely peak. Finally, they released the official word that the flare had an intensity of at least 28.0x10E-4 Watts per square meter for a whopping X28!



The X28-class flare of November 4, 2003, as seen by the SOHO Extreme ultraviolet Imaging Telescope (EIT). Credit: SOHO/NASA

This flare came after an already highly active period of solar activity. The days leading up to November 4 were filled with many flares, a number of which were above X10. This level of flare activity created a media buzz and was a household topic. Some radio talk show hosts explored the thought that these flares were proof that the end of the world as we know it was upon us. Others took a more balanced perspective.

Since we only began to keep accurate records during the 1970s, there might have (and probably have been) more intense flares in the past. Our perspective of these giant flares is somewhat limited. Certainly, X-class flares of this magnitude are not regular events. Yet, they certainly are not unheard of. We can say that, at least, this level of flaring is something we could see every 20 to 40 years.

In addition, this level of activity is not unusual during the decline in a solar cycle. We have witnessed such surges in solar activity in the decline of a cycle during many past solar cycles. These flares and surges in activity are normal events in the life of our sun, however momentous they may seem to us.

Air Attack: Monitoring California's Airborne Firefighters

By Laura Quarantiello

It began small, sparked by a beacon fire lit by a hunter lost in the San Diego mountains. Within hours, fueled by the hot, dry Santa Ana winds so common to this state in October, it became something much more: it became one for the record books.

In the next few days the conflagration they named the Cedar Fire would kill 14 people, burn over 273,000 acres and destroy 2,232 homes. It was a nasty fire, a wind-driven monster that burned through neighborhoods, crossed freeways, and threatened to meet up with the Paradise Fire, another blaze burning nearby. If the two fires had become one, firefighters feared they wouldn't be able to stop it. With resources stretched thin due to other fires in the state, San Diego County was caught short.

Three factors would eventually come into play to deny the spread of the Cedar Fire: the heroism of the firefighters on the ground, a shift in wind direction, and the arrival of air tankers and helicopters from the California Department of Forestry and Fire Protection.

A Little Help from Above

With the long days of autumn in Southern California come the hot, dry Santa Ana winds which leach moisture from already summer-parched grasses and fan the smallest spark into a full-fledged fire. California – the land of sandy beaches – is also the land of fire. The responsibility for fire protection of more than 33 million acres of wildlands in the state belongs to the California Department of Forestry and Fire Protection.

CDF has been in existence for more than 80 years and is the largest firefighting organization in California. It's also third largest in the United States, with 3,800 full-time fire professionals, 1,400 seasonal firefighters, 5,600 local government volunteer firefighters, 2,600 Volunteers in Prevention, 4,300 inmate firefighters, 194 fire crews, 634 fire stations, and 40 conservation camps. When a wildfire ignites, you can be sure that the firefighters, fire engines, and aircraft of CDF will get the call, often working side by side with local and federal firefighters. CDF responds to an average of 6,300 wildland fires every year.

A large part of CDF's success with fighting wildfires comes from above – through the use of aircraft and helicopters which allow quick and targeted attacks against advancing fire lines. The air assets complement and assist fire crews on the ground by dropping water or chemical retardant on the flames. An air drop of either water or retardant is often enough to stop a fire in its tracks, covering a large area in seconds.

Air tankers drop fire retardant loads of between 300 and 3,000 gallons. Helicopters can drop water, foam or retardant of between 300 and 2,000 gallons. The retardant is a slurry mix of a chemical salt compound, water, clay or a gum-thickening agent, and a florescent red coloring, weighing nine pounds per gallon. The gum thickener in the retardant mix allows it to "stick" to vegetation. The color fades to an earth tone within several weeks.

There are thirteen air attack and nine helitack bases in the state, hosting sixteen Grumman S-2T (1200 gallon) air tankers, seven Grumman S-2A (800 gallon) air tankers, nine UH-1H Super Huey helicopters, and 13 OV-10A Bronco air attack aircraft.

The Broncos use the callsign "Air Attack ###" and are the airborne commanders, flying overhead to direct air tankers and helicopters for retardant and water drops. The tankers utilize the callsign "Tanker ##", while the helicopters use "Helicopter ##." "Helitack ##" is the callsign used by helicopters carrying firefighters for initial attack fire suppression.

The average annual budget for CDF's aviation program is $20 million. A total of eighteen CDF personnel oversee the program in addition to 130 contract employees. The current contractor, DynCorp, provides pilots and aircraft maintenance.

Fire and Water

When the sun – blood red from a haze of smoke – rose on that Sunday morning in October, it seemed all of San Diego was in flames. The Paradise and Roblar fires burned to the north, the Cedar Fire to the east, and the Otay Fire to the south. CDF air assets had been unable to respond the night before due to darkness constraints, so crews on the ground had fought the blazes alone throughout the night. Now, in the coming light of morning, CDF air frequencies came alive as Air Attack 330, an OV-10A, flew over the flames.

CDF utilizes four primary frequencies for air tanker operations: 151.280, 151.295, 151.310, and 151.220, all in FM mode. They

are referred to by color codes (Blue, Green, Yellow and Red, respectively). Red is used for air to ground coordination between the air commander and the operations chief on the ground, while the other three frequencies are used for air to air between the Air Attack aircraft and tankers. VHF ("Victor") AM mode frequencies in the air band are also used to coordinate CDF and US Forest Service aircraft, as well as to talk with civilian aircraft in the area, and for informal air to air chats. Helibase operations also use VHF air frequencies.

With the air frequencies already preloaded in my BC780XLT, I listened as two air tankers arrived on the scene. After some discussion, I heard two words you never want to hear from CDF pilots in the midst of a brush fire: "return home." The visibility was terrible and sharp up and downdrafts caused by terrain funneling the Santa Ana winds posed very real dangers to the heavily-laden S-2s who had to sweep in low and slow for their drops. The air commander made the safety decision and the aircraft retreated to the air attack base at Ramona.

It would be nearly 24 hours before CDF air tankers were able to return and drop on the fire. During that time firefighters did hand to hand combat with the blaze, often being beaten back when flames rushed up hillsides and down narrow valleys. 113 firefighters would be injured on the fire lines. Fourteen people – including one firefighter, Steve Rucker of Novato – would lose their lives to this fire, which moved so quickly that some people died in their vehicles trying to escape. At one point, an 18 mile wide wall of flames pushed through drought-tindered brush, totally destroying the mountain town of Cuyamaca and threatening the historic town of Julian, which was saved only by a heroic all-night stand by firefighters.

When Monday dawned and the wind finally shifted – moving the fire in new and treacherous directions – CDF air tankers and helicopters went to work. Air to air frequencies were busy, as were VHF base frequencies as aircraft conducted continuous drop, load and return missions.

Listening in required two scanners, with a third dedicated to ground-based fire operations. The best picture of the fire and where it was heading, however, were the CDF air frequencies. From high above, the Air Attack spotter gave a running commentary on the path of the fire and the effects of retardant drops.

CDF air frequencies in the 151 MHz band are simplex FM mode and suffer from the same line of sight problems as AM air frequencies. The Air Attack spotter was the easiest to hear because of his altitude, while the tankers tended to fade when working low on a drop. Terrain was also a factor in hearing communications, but an outside discone antenna helped.

The Cedar fire is still burning as I write this, three weeks after it began. It was an extreme fire, a devastating burn that began small and might have been contained more easily if air tankers had been allowed to fly near dusk on that first day. That fact more than any other has been a source of controversy in the local media and only proves the value of California's aerial firefighters.

CDF Air Tactical Channels

166.675	Air Tac 1
169.150	Air Tac 2
169.200	Air Tac 3
170.000	USFS Air to Ground
151.280	Air Tac 4 (Blue)
151.295	Air Tac 5 (Green)
151.310	Air Tac 6 (Yellow)
151.220	Air to Ground (Red)
118.925	VHF
119.950	USFS Heliports
122.850	VHF 4
122.900	VHF 2
122.925	VHF 1
122.950	Air to Air
123.025	Helicopters
123.050	Helibases VHF 6
123.075	VHF 5
122.975	VHF 3
123.975	Air to Air
135.975	Air to Air

CDF Tactical Channels

151.145	Tac 1
151.160	Tac 2
151.175	Tac 3
151.190	Tac 4
151.250	Tac 5
151.325	Tac 6
151.340	Tac 7
151.385	Tac 9
151.400	Tac 10
151.475	Tac 11
151.460	Tac 12
151.475	Tac 13

CDF Command Channels

151.355	Command 1
151.265	Command 2

CDF Local Channels

151.130	RRU 3 - Local 3 Perris/NEU East Grass Valley
151.160	SHU Redding
151.170	CZU Felton
151.190	MVU Monte Vista/TUU Tulare
151.250	HUU East Fortuna/LMU Susanville/ BDU 3 San Bernardino
151.325	NEU Grass Valley/ SKU Yreka/SLU San Luis/BDU 2 San Bernardino
151.340	LNU East St. Helena
151.370	TGU Red Bluff
151.385	MEU Howard Forrest/FKU-E Fresno/RRU 1 E & W - Local 1 East Perris
151.400	BTU Oroville
154.415	BUTT SUP Butte Support
151.445	SCU Morgan Hill/BDU 1 San Bernardino
151.460	LNU West St. Helena/MMU Mariposa
159.285	RRU 2 - Local 2 Perris

Tankers and Air Attack Aircraft

Base	#	Type	No#
Ramona	330	OV-10	N409DF
Ramona	70	S2T	N427DF
Ramona	71	S2T	N432DF
Hemet	310	OV-10	N429DF
Hemet	72	S2T	N435DF
Hemet	73	S2T	N437DF
Paso Robles	340	OV-10	N418DF
Paso Robles	74	S2T	N439DF
Paso Robles	75	S2T	N420DF
Porterville	410	OV-10	N419DF
Porterville	76	S2A	N417DF
Fresno	430	OV-10	N407DF
Fresno	78	S2A	N412DF
Hollister	460	OV-10	N415DF
Hollister	80	S2A	N404DF
Hollister	81	S2A	N447DF
Columbia	440	OV-10	N400DF
Columbia	82	S2T	N422DF
Columbia	83	S2T	N424DF
Grass Valley	230	OV-10	N408DF
Grass Valley	88	S2T	N426DF
Grass Valley	89	S2T	N425DF
Santa Rosa	140	OV-10	N414DF
Santa Rosa	85	S2T	N438DF
Santa Rosa	86	S2T	N433DF
Ukiah	110	OV-10	N410DF
Ukiah	90	S2T	N434DF
Ukiah	91	S2T	N428DF
Chico	210	OV-10	N402DF
Chico	84	S2A	N423DF
Redding	240	OV-10	N421DF
Redding	94	S2A	N446DF
Redding	95	S2A	N448DF
Rohnerville	120	OV-10	N413DF
Rohnerville	96	S2T	N440DF
Sacramento	100	S2T	N441DF

More Area Fire Frequencies

CDF Radio Frequencies from Gary Webbenhurst's compilation of wildfire frequencies for California and the Pacific Northwest
garywebenhurst@monitoringtimes.com

Location	Net	Output	REPEATER Input	
Statewide	Command 1	151.355	159.300	
Statewide	Command 2	151.265	159.330	
Statewide	Red Tactical	151.220	None	
Statewide	Blue-Air	151.280	-	
Statewide	Green-Air	151.295	-	
Statewide	Yellow-Air	151.310	-	
Statewide	Tactical	151.145		
Humb-Del Norte	Local	151.250	159.405	Ylw
Mendocino	Local	151.385	159.270	Ylw
Sonoma	Local	151.460	159.390	Ylw
Lake-Napa	Local	151.340	159.315	Ylw
Santa Cruz	Local	151.445	159.345	Grn
San Mateo-St Cruz	Local	151.370	159.285	Grn
Siskiyou	Local	151.325	159.360	Blu
Lassen-Modoc	Local	151.250	159.405	Blu
Shasta-Trinity	Local	151.160	159.270	Grn
Tehama-Glenn	Local	151.370	159.285	Grn
Butte	Local	151.400	159.375	Grn
Nev-Yolo-Placer	Local	151.325	159.360	Blu
San Luis Obispo	Local	151.325	159.315	Blu
San Bernardino	Local-West	151.445	159.390	Ylw
	Local-East	151.325	159.315	Ylw
	Local-Owens Vly	151.250	159.405	Ylw
Riverside	Local-West	151.385	159.360	Ylw
	Local-East	151.175	159.285	Ylw
San Diego	Local	151.190	159.225	Blu
Region-Wide	Riti-Support	151.340	159.345	-
Amador-El Dorado	Local	151.190	159.225	Blu
Tuolumne-Calavaras	Local	151.175	159.450	Blu
Madera-Mar-Merced	Local	151.460	159.390	Ylw
Fresno-Kings	Local-Primary	151.385	159.270	Ylw
	Local-Secondary	151.160	159.360	Ylw
San Benito-Montery	Local	151.250	159.405	G/B
Tulare	Local	151.190	159.225	Ylw

CTCSS-(PL) Repeater Selection CDF/USFS:
Tone 1 110.9 Hz
Tone 2 123.0 Hz
Tone 3 131.8 Hz
Tone 4 136.5 Hz

Tone 5 146.2 Hz
Tone 6 156.7 Hz
Tone 7 167.9 Hz
Tone 8 103.5 Hz

Grand Prix Fire Monitoring
by Todd Stout [kd6ecz@yahoo.com]

Here is a list of frequencies that I monitored activity on during the Grand Prix Fire. I can't remember 100% which ones were active but most if not all of them were at some point. (See Todd's *Letter to the Editor* on page 6.)

The Grand Prix Fire started on 10/22 and burned through northern Fontana, Rancho Cucamonga, San Antonio Heights (an unincorporated area just north of Upland), Upland, Claremont and pretty much stopped at La Verne. The fire also headed northward towards Mount Baldy Village. Once the fire reached the boundary of the Angeles National Forest, that part of it was renamed the Padua Fire. You may hear of see reference to this fire as the Grand Prix, the Padua, or the Grand Prix / Padua Fire. It was all the same incident.

154.0250	Fire Blue	Ontario Fire Dispatch Simulcast (Includes, Chino, Ontario, Rancho Cucamonga, And Upland)
154.3250	Fire Red	County VHF Mutual Aid
151.1450	103.5	County 1 - Valley VHF Patch To 6-Fire-1 On 800 MHz
159.1200	167.9	County 2 - Mountain VHF Patch To 8-Fire-1 On 800 MHz
151.4450		BDU Local 1 CDF Valley/Mountain Area Fire Dispatch
154.2800	White 1	Monitored Some Grand Prix Fire Activity
154.2650	White 2	Monitored Considerable Grand Prix Fire Activity
154.2950	White 3	Monitored Some Grand Prix Fire Activity
151.3550	CDF Cmnd Net 1	CDF Command Net 1
151.2650	CDF Cmnd Net 2	CDF Command Net 2
151.2200	CDF Red Air	
151.2800	CDF Blue Air	
151.2950	CDF Green Air	
151.3100	CDF Yellow Air	
172.3750	ANF Forest Net	USFS Angeles National Forest
164.9375	ANF Admin Net	USFS Angeles National Forest Administration
171.4750	BDF Forest Net	USFS San Bernardino National Forest
172.2250	BDF Admin Net	USFS San Bernardino National Forest Administration
166.5625	South Ops	Region 5 South Zone Operations
415.5250	South Ops-UHF	Region 5 South Zone Operations (UHF Link)
168.0500	NIFC Tac-1	
168.2000	NIFC Tac-2	Monitored Considerable Grand Prix Fire Activity
168.6000	NIFC Tac-3	
168.7000	NIFC Command-1	
168.1000	NIFC Command-2	
168.0750	NIFC Command-3	
170.0000	USFS R5 Air/Grnd	
167.9500	BLM CDF Air/Grnd	BLM Cal Desert District Air To Ground
166.3750	BLM Cal Desert	BLM Cal Desert District
169.1250	R5 Travel Net	
168.6500	R5 Project Net	

I also monitored considerable activity on several West End Communications Authority (WECA) 800 MHz trunked radio system talkgroups. I mainly kept my Bearcat locked on 2576, though, which is where the majority of the RCFD radio traffic was.

WECA (county system #9)
851.5000 853.4500 854.9750 856.4250 866.1375 866.1625 866.3625 866.4125 866.6375 866.8625 866.9125 867.1375 867.3875 867.6125 867.6625 867.8625 867.9125 868.1375 868.1875 868.3625 868.4125 868.8375

Active fire related talkgroups
1904 FIRE DISPATCH "Ontario"
2096 FIRE COMMAND 1
2128 FIRE COMMAND 2
2416 Rancho Cucamonga FD TAC-1
2576 Rancho Cucamonga FD TAC-2 - Monitored considerable Grand Prix Fire traffic

4272 Upland PD BLUE-1
4400 Upland PD BLUE-2

Both Rancho Cucamonga PD (they are actually the San Bernardino County Sheriff) and Fontana PD could be monitored on San Bernardino County system #6&7 (for complete system details, see http://www.trunkedradio.net).

System 6&7
868.3375 868.1625 868.6125 868.3875 860.8125 859.8375 868.6625 867.8875 867.6875 867.6375 867.4125 867.3625 867.1625 857.8125 866.8875 866.8375 866.6125 866.3875 866.3375 855.1875 856.8125 855.6625 855.5875 855.4375 854.8375 855.8625 855.6125 855.4425

304 6-WVC-1 San Bernardino County Sheriff - Rancho Cucamonga
336 6-WVC-2 San Bernardino County Sheriff - West End (including the San Antonio Heights area)
688 6-WTAC-3 San Bernardino County Sheriff - Tactical

1008 6-FON-1 Fontana PD main
1040 6-FNTAC-1 Fontana PD tactical
1072 6-FON-2
1104 6-FNTC-2

G3 WiNRADiO g303i

Introducing a breakthrough

Just when you thought that there is nothing new in radios, along comes the new WiNRADiO G303i software-defined shortwave receiver!

This new, low-cost receiver inaugurates the third generation of wide-band, PC-based receiving equipment from WiNRADiO. It is the first commercially-available receiver where the final IF stage, as well as the all-mode demodulator, are entirely executed in software, controlled by your personal computer.

While the Standard Demodulator of the G303i provides the level of performance of a quality shortwave receiver--including synchronous AM demodulation and a real-time spectrum scope--the optional Professional Demodulator of the G303i-P offers continuous IF filter bandwidth adjustment, interactive block diagrams, two additional audio spectrum scopes, and even inbuilt THD and SINAD measurement facilities. Additional software upgrades, including a Digital Radio Mondiale (DRM) demodulator, will be available soon!

What's included?

The standard WR-G303i package includes:
WR-G303i receiver card
Application software
Comprehensive user's manual
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Technical Specifications

Frequency range	9 kHz to 30 MHz
Tuning resolution	1 Hz
Modes	AM, AMN, AMS, LSB, USB, CW, FM3, FM6, FMN *(The optional Professional Demodulator also includes DSB and ISB modes.)*
Antenna	50 ohm (SMA connector)
Dynamic range	95 dB
IP3	+8 dBm

Selectivity

AM	6 kHz
AMN, AMS	4 kHz
LSB, USB	2.3 kHz
CW	0.5 kHz
FM3	3 kHz
FM6	6 kHz
FMN	12 kHz

Sensitivity

AM	1 uV
LSB, USB	0.3 uV
CW	0.18 uV
FM	0.4 uV

Notes

1. Selectivity values are at -6dB. These values apply only to the ***Standard Demodulator***. The optional ***Professional Demodulator*** has IF bandwidth continuously adjustable from 1 Hz to 15 kHz.

2. Sensitivity is shown for 1.8 to 30 MHz, 10dB S/N.

3. Specifications are subject to change without notice.

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Ken Reitz, KS4ZR
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Ten Meters: Gateway to Getting on the Air

Long time *MT* reader Judy May, KI4CPQ, wrote a few months ago to say she had just gotten her Technician Class license and now she writes that she has upgraded to General Class. Good show, Judy! She got a good deal on a Radio Shack HTX-10 ten meter transceiver, put up a dipole and her very first contact was with a ham on the Turks & Caicos Islands! She and her husband Greg, KI4CPP, are both hams and avid tandem bicyclists.

As usual, Judy had some great beginner questions, this time concerning 10 meter operating. She asks, "...is there any part of the band...that is more frequently used to make new contacts?...Since we are approaching the low point of solar activity, how bad is 10 meters?...Is there anywhere on 10 meters I might find someone to talk to using AM instead of SSB?"

The ten meter band is the single most interesting band in all of amateur radio. The qualities of the band make it great for DX as well as local contacts, and it's big enough to allow operations of every possible mode. For many hams around the world it is the band of first choice. Let's take a close look at some of the great aspects of this fun band.

Antennas & Radios: The Size is Right

Because of the frequency, 28.000 to 29.900 MHz, antennas are relatively short for HF work, slightly shorter than CB antennas. And, because of enormous bandwidth – nearly 2 MHz wide as opposed to 12 and 17 meters which are only 100 kHz wide – there's plenty of room to spread out.

A ten meter rotatable dipole antenna is cheap, easy to put up and light weight enough to use with a TV type rotator. (Courtesy CushCraft Corp.)

There is a lot of literature on the subject of 10 meter band antennas. So much so that here I'll only introduce them by name. An antenna designed for operation on one band is called a *monobande*r. Ten meter monobander design includes the old-fashioned dipole (flat-top, slopers and "Vs"), the ground plane vertical, single element rotatable dipole, multi-element Yagi, the quad, the loop, J-pole, rhombic, wire beam, vertical beam – and that's just the beginning. When propagation is favorable it doesn't take much. I've talked to hams who were using everything from rain gutters to aluminum window frames to transmit on ten.

Ten meters is so popular that there are several transceiver manufacturers who make rigs just for 10 meter operation and they tend to be cheaper than all-band rigs. Expect to pay less than $300 for a new Ranger RCI-2959DX 10/12 meter model. There are also quite a few of these turning up at hamfests as used rigs which go at even cheaper prices. That makes it a great entry level radio for beginner hams.

These transceivers tend to have lower power (10-25 watts output) than the all-band rigs and are considerably smaller. This also makes them great mobile HF rigs as they take up less room in the car and don't require large antennas.

This multi-mode interface lets you monitor all the action on 10 meters. You can view CW, RTTY, SSTV, Packet, and more on your computer screen. (Courtesy TigerTronics)

Multi-Mode, Beacons, and DX Galore!

Because the band is so large there's room for all modes of operating and everything is encouraged (see chart). Morse Code (CW), Single Side Band (SSB), AM, FM and a multitude of digital modes including Slow Scan TV (SSTV), packet, and old fashioned radio Teletype (RTTY) can all be found at some time on some part of the band. This is a great place to try monitoring the digital modes using any of the inexpensive digital interfaces designed to link your radio with your computer.

Ten meter beacons are automated stations which transmit the station call sign in CW on a fixed frequency followed by a tone. The more sophisticated beacons transmit on stepped up and then stepped down power with each transmission. The purpose of the beacon is to indicate propagation on the band. Usually you can get the general idea of the beacon location by reading the call sign, *i.e,*. an XE at the beginning of the call sign indicates Mexico, VE indicates Canada, LU for Argentina and so on.

Propagation Roulette

In general, 10 meters becomes active with the sunrise. You'll note that as the sun progresses around the globe the ionosphere in those regions become active enough to allow radio waves to bounce and then the DX fun begins. As night falls over your area the atmosphere stops being active and then communications is possible using *ground wave* propagation which is good only for local contacts.

The big question on ten is always, "Where will the signals come from?" It can be different each day. Then, occasionally, we'll get a solar flare or two or three as we had last October and all kinds of things happen. Propagation on 10 meters is determined solely by the Sun. The solar cycle, the solar index, sunspot count, all of these things help determine how good or bad propagation will be on 10. But, there is simply no substitute for tuning in and hearing with your own ears. Check the beacons and check the list on DX-summit (see Resources) for the very latest around-the-world DX list, updated every three minutes.

Local Club Activity

Because of the night-time local propagation factor on 10, there are dozens of local amateur radio clubs throughout the U.S. and Canada which use various frequencies for local club on-air activities. Of course, when the atmosphere is activated, the locals can be joined by all manner of DX stations chiming in. Sometimes it becomes amusing as a local club meeting disintegrates while all the locals try to work the breaking DX station!

There are also national and international clubs which use 10 meters as a meeting place year 'round, regardless of band conditions and solar cycle. A good example of this is Ten-Ten International which began in the 1950s as an organization of hams intent on seeing that the band would not be neglected and fall prey to commercial interests.

With or Without a Ticket

Ten meters is a great place for beginners

Ranger 10 & 12 meter transceiver. A great entry level rig for getting started on 10 meters. It's small and relatively inexpensive making it a great base or mobile radio. (Courtesy Ranger Communications, Inc.)

with or without a license. For newly minted hams it's a good introduction to DX as well as transcontinental contacts, and for SWLers it's a great place to listen for rare DX stations and to monitor all manner of modes and beacons.

Some DX operators will QSL SWLers if they send in signal reports and return postage. Use the amateur signal report method – *e.g.* 5 (readability) 9 (strength) for SSB or 5 (readability) 9 (strength) 9 (tone) for CW – and always send a self-addressed envelope with appropriate number of IRCs (International Reply Coupons available at your local Post Office) or "Green Stamps" (U.S. Dollars). Some DX hams will QSL SWL via the bureau; others won't respond no matter what.

One problem which comes and goes on the band is the presence of unlicensed operators. Most of the pirate activity is generated in rural Brazil where the infrastructure is poor and 10 meters is used as a local "telephone" system. Occasionally errant CBers wander onto the band, but are quickly hustled back to 11 meters. There have been times when truckers buy 10 meter rigs and use them for local or long distance communications. The FCC is trying to track them down and slap the operators and their companies with fines.

For the most part 11 meter operators are quite content with their own space and don't present a problem for legitimate amateurs. In the event that you are called by an unlicensed operator you simply inform him that your FCC license does not allow you to communicate with unlicensed operators.

❖ Take the 10 Meter Plunge

Whether seasoned amateur or brand new licensee, tune in to 10 meters and enjoy ham radio at its best. If you make a practice of being on 10 you'll find it's possible to meet the same hams over and over. While the DX season lasts you can even set up a "sked" (operating schedule: time and frequency) and have a chat every day. That's how you'll meet some great folks who, over the years, will become great friends.

THE BIG PICTURE: Map of the 10 meter universe

FREQ. Type of Transmission
28.000-28.070 CW only
28.025 CW Rare DX & DXpeditions operating split
28.600 CW QRP operating freq.
28.070-28.150 RTTY & CW
28.080 RTTY Rare DX & DXpeditions operating split
28.1010 Ten-Ten International CW Calling Freq.
28.110 TechPlus CW QRP
28.120-28.189 Digital/Packet & CW
28.190-28.300 CW & Beacons
28.300-29.300 SSB World Wide
28.336 County Hunters
28.360 European SSB QRP
28.380 Ten-Ten SSB International Calling Freq.
28.385 TechPlus SSB QRP
28.425 Ten-Ten SSB International Calling Freq.
28.495 SSB Rare DX & DXpeditions operating split
28.680-690-700 Slow Scan TV
28.885 6 meter liaison frequency (6 meter DX announcements)
28.885 SSB QRP operating freq.
28.945 FAX operating frequency
29.000-29.200 AM (29.100 calling freq.)
29.300-29.510 CW/SSB Satellite Downlink
29.520-29.590 FM Repeater Input Freqs.
29.600 National FM Simplex Calling Freq.
29.610-29.700 FM Repeater Output Freqs.

This list is compiled from various web sources including http://www.arrl.org, http://www.qsl.net/kd4sai/10meter.html, http://www.ten-ten.org, http://www.amsat.org, http://www.qrparci.org/.

❖ Ten Meter Resources

DX action on 10 meters is found on DX-Summit where the latest 100 DX operators around the world on 28MHz are listed and reloaded every 3 minutes! **http://oh2aq.kolumbus.com/dxs/28.html?**

An extensive list of 10 meter beacons, compiled by Ten Ten International, is found on their website: **http://www.ten-ten.org** Click on the 10 meter beacon button. This list is updated constantly and includes frequency, call sign, location and operating notes. The Northern California DX Foundation maintains a number of beacons on several bands. You will find a list of all their beacons, their frequencies and transmission schedule at **http://www.ncdxf.org/Beacon/BeaconSchedule.html.**

AO-7 Amsat Oscar 7 was an amateur radio satellite launched 11-15-74. By mid 1981 it suffered a battery failure and was declared dead. However, it came back to life when it was detected by sharp eared Pat Gowen, G3IOR. Now powered only by its solar panels when they are in sunlight you can still monitor AO-7 on the 10 meter band. To view a log of latest contacts see: **http://www.emilyshouse.com/experthams/ao7/main.php.**

10 Meter QRP, low power operating (less than 5 watts on CW and less than 10 watts SSB) frequencies: 28.060 CW 28.885 SSB, 28.360 Europe SSB. For more information on QRP operating: **http://www.qrparci.org/**.

Ten meter antenna information can be found in the ARRL Antenna Handbook which is widely available at many radio retail sources as well as directly from the League: ARRL 225 Main Street Newington, CT 06111-1494 860-594-0355.

Sources for 10 meter transceivers and antennas: Amateur Electronic Supply 5710 W. Good Hope Road Milwaukee, WI 53223 800-558-0411 **http://www.aesham.com** ; MFJ Enterprises, Inc. 300 industrial Park Road Starkville, MS 39759 800-647-1800 **http://www.mfjenterprises.com**; Ham Radio Outlet call for store nearest you 800-854-6046 **http:www.hamradio.com**; Radio Shack 800-THE-SHACK **http://www.radioshack.com**.

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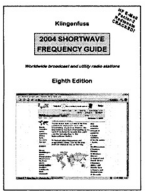

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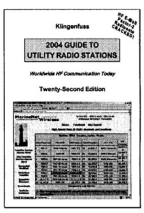

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Ask Bob

Bob Grove, W8JHD
bobgrove@monitoringtimes.com

Q. *I would like to connect two shortwave receivers to two antennas to minimize signal fading. What is the best way to do this? (Per G. Ruuth, North Highlands, CA)*

A. There are two types of diversity reception: frequency diversity, in which two different broadcasting frequencies are tuned in on separate receivers and their audio outputs are combined in a mixer; and antenna diversity, in which two separate antennas with different polarization, spacing, and/or directivity are combined into one receiver.

In either case, the audio summation of the two signals is usually more stable than listening to just one receiver and antenna.

Shortwave listeners may wish to experiment with antenna diversity by utilizing two different antennas, widely separated from each other (ideally by at least one full wavelength at the receiving frequency). The two transmission lines may be combined through a conventional TV splitter in reverse, although they can probably be tied directly together at the receiver connection with little signal degradation.

For listeners with two receivers, frequency diversity reception can be accomplished by using the TV splitter (or directly connecting) one antenna to both receivers. The external speaker outputs are combined through a 10 ohm (or so) resistor from each audio line into an amplified speaker system such as those readily available for computers. This is to allow the receivers to be adjusted for low volumes to prevent high audio voltage from one receiver possibly causing damage to the other receiver's audio stages.

A search of the Internet failed to find any hobby-level, commercial, diversity combiners or comparators.

Q. *What are "LowFER" and "HiFER" in radio communications? (Dale Martin Unger, Baltimore, MD)*

A. The terms refer to low frequency experimental radio and high frequency experimental radio. FCC regulations (Part 15) allow unlicensed radio communications using extremely low power at various frequencies throughout the spectrum. Hams are the most common participants due to their technical interest in radio. Look for their Morse or digital transmissions around 137.7 kHz and 13.555 MHz. Many other frequencies are used as well.

Several excellent Internet web sites provide information on this interesting sidelight of the radio hobby. Type "lowfer" or "hifer" into the search engine, or visit the Longwave Club of America (LWCA) website at **http://www.lwca.org/sitepage/part15/index.htm**

Q. *I need a temporary antenna for scanner listening. Can I use a mobile antenna on my porch? (David Jolly)*

A. Since most of your listening will probably be in the 150, 450, and 850 MHz ranges (less at 30-50 MHz), you can use most any mobile antenna, just so long as it is attached to a metal mass below it (emulating a car roof). This could be an iron railing that could support the magnetic base.

You could also place the antenna on the floor in the center of an "X" made out of two sheets of metal foil, each about 3-ft long (1-1/2 feet either side of the center). This provides a good "counterpoise," which is very important.

Some folks simply set the magnetic-base antenna atop a file case, refrigerator, or other metallic mass inside the dwelling, assuming you don't have a lot of metal in the walls which would shield the antenna from receiving signals well. But I can't over-emphasize the importance of that metal under the antenna; you can experiment with such an antenna on weak signals, finally leaving it where the reception is best.

Another good choice would be the Grove OMNI. Although taller than the mobile whip, it needs no counterpoise under it, and you can put it on a porch rail or even lean it against a wall. Best of all, it's a no-compromise antenna with excellent receiving capability.

Q. *I don't attend sports events, but I was watching a football game on TV the other day and noticed a bar of light across the playing field indicating the first down. How is this done? (Mark Burns, Terre Haute, IN)*

A. The line isn't actually present on the playing field, it's inserted electronically into the video by the engineer just like he would do with a news bulletin scroll.

Q. *I have a power-line interference problem which wipes out the entire shortwave range on my radio. I've confirmed that it's outside of my house by turning off the power and listening to the radio on battery power, but the power company says they can't hear it with their equipment, so it's not their problem. What can I do? (Steve Bristol, email)*

A. First, confirm that it's the power line and not your radio. Listen with a small AM or shortwave battery portable or your car radio to see if you can duplicate the interference. Be sure to shut off the main breaker switch on your electrical panel to shut off any possible noise generator in the house while you are doing the test, thus confirming the external source of the noise. Power line noise is typically caused by one of the following:

Defective transformer
Tree branch touching the power line
Bad ground line on the pole
Arcing across a cracked or dirty insulator
Loose electrical contact in the wiring

You may be able to nail down which pole or portion of the overhead line it is by using a small AM portable radio as a test probe. Keep in mind that these little portables have an internal ferrite-rod antenna that is very directional. You can use that to your advantage as a radio direction finder (RDF).

Tune it to a frequency where you can barely hear the interference; then walk around until you find the loudest interference. Visually inspect overhead to see if you can spot a problem. You can even stomp the pole with your foot to hear any changes in the interference which would confirm which pole it is. Some folks use a sledge hammer for this!

I've always found that our state public utilities commission is very cooperative in cases like this when either the power company or the phone company is causing radio interference. Tell them that you are receiving electrical interference from the power lines which disrupts your radio listening, and that you've notified the power company, but they say they don't hear it and won't do anything about it. Let them know that you have confirmed it is the power company's equipment. They will probably give you suggestions to follow.

Good luck!

Questions or tips sent to Ask Bob, c/o MT are printed in this column as space permits. If you desire a prompt, personal reply, mail your questions along with a self-addressed stamped envelope (no telephone calls, please) in care of MT, or e-mail to bobgrove@monitoringtimes.com. (Please include your name and address.) The current Ask Bob is now online at our website: ***http://www.monitoringtimes.com***

Getting Started

Bright Ideas

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1 Well, the holidays are over. Time to take down the tree and the decorations. As my reward for taking care of those chores, I get to play with my *new radio*. Not a typical monitoring type radio, but my new XM satellite (FM) radio. This slick puppy is unbelievable. I mainly use it in the house, but it unplugs in about two seconds when I want it in the van for longer trips.

Yeah, I know, it's about $200, plus the subscription to the satellite service for $10 a month, but it's well worth it. Remember, I live out in the heavily forested mountains, and frankly, I can't receive very many FM broadcast stations clearly. The XM satellite service gives me over 100 digitally clear channels. It even comes with a remote control and a setting for LARGE display: I can control the radio from across the room and read the display scroll the name of the song and the performer.

Yes, you can even receive the BBC, CNN, ESPN, WX, etc. If you have home reception difficulties, or travel a lot in the wide open western states, this is a godsend.

2 Start the New Year off with an achievable goal. Get your ham radio license or upgrade it. The new technician questions are supposedly more understandable. You can buy the book for about $12, or I can email you the *new* pool of questions for the FCC Technician exam. It is in Word 2002 format. I have deleted the incorrect answers, leaving just the correct answers.

Over my years of teaching the class, I have found that if you read all the questions and all the answers, including the incorrect ones, you are more likely to select a wrong answer. After all, you read the incorrect answer as many times as you read the correct answer.

Email me, and I will send you the modified pool of questions. This is all in the public domain. The questions, and the correct answers, are available on the internet from several sources.

3 The ARRL has a new, fun website designed to give youngsters a look at beginning radio and electronics projects. Try it out at: **http://www.arrl.org/FandES/ead/youth/**

4 Air Travel Solutions. Mick Capman, KC8WQM, was kind enough to send in his tips for successfully passing through airport security. (See December *Letters to the Editor* for the full text.) He says "I copied, and reduced in size my FCC station license, and taped it to my radio. Standing near the TSA inspector, I always remind them of my license being right there on the radio." He also suggests wearing a hat or shirt that identifies you as an amateur radio operator, so your appearance is consistent with the radio gear. You'll also approach the inspections less stressed if you take a few steps to reduce the focus and suspicion surrounding radio communications gear aboard an aircraft.

Thanks for the tips, Mike. I just made several photocopies of my license for my traveling adventures.

5 Kulpsville or Bust! I am planning to attend the NASWA Conference March 12-13, 2004. I look forward to meeting a lot SWLs, and learning a lot about a part of the hobby where I am relatively inexperienced. Why not join us? Their website is **http://www.swlfest.com/**.

6 I recently crowed about my new radio room office chair. Well, in the same visit, I spotted a new oak CD/bookcase that would be perfect for HTs on static display, storing batteries and drop-in chargers. Reasonably priced at $30, some assembly required, it was a simple one person effort taking about 15 minutes. I plan to add two more to display my Yaesu radios, and the fourth with mixed brands. The photos show my Icom, and Kenwood collections. Photos are also a way of documenting my house furnishing for insurance purposes – an idea that is more important than ever given the terrible fires in southern California during late October.

7 Speaking of wildland fires, it is never too late, nor too early, to review and update your frequency list of channels used in your area during a major wildland fire. The one in California had so many resources from so many different departments, I would image that coordinating radio channel assignments was mind boggling. If you have any frequencies to share, please forward them to the *MT* editor at *editor@monitoringtimes.com*.

As always, submitted frequencies must be accurate: you heard them and verified them. Lists that are found on the web or out of a book are not acceptable. If they are specific to Washington, Idaho, or Oregon, you can send me a copy. My Wildland Fire list for summer 2004 should be complete in May for those who wish an emailed copy.

7 A few columns back, I wrote of my using whiteout liquid to highlight special or frequently used buttons on my scanner. Now I have an "upgrade." I take a sheet of Avery labels and type in what I need. In many cases I just want a blank white label with no markings. I can then carefully cut out the desired size, and use a forceps to carefully put it in place. It won't work on the handheld scanners because of the frequent finger pushing, but it seems to hold up well on the table top scanners because they have larger buttons, and the finger rarely goes astray. I am still working on this process. Anybody have an even better idea?

Since this is the first column of the new year, let's get in the annual declaimer statement. I don't accept free gifts, own stock, or receive any other type of financial reward from any of the vendors or manufacturers that I mention in my column. I often have a picture of the items I purchased, and a fair, objective review of the product. I don't return these items; most are put to everyday use here at radio ranch.

Dan Veeneman
danveeneman@monitoringtimes.com

The APCO-25 Snowball Effect

Happy New Year! Welcome to the new *Scanning Report* column. *Monitoring Times* has combined the former *Scanning Report* with the old *Tracking the Trunks* column to bring you a comprehensive forum for scanning-related news and information.

One common theme we're seeing in public safety radio is the transition from analog to digital. As agencies upgrade their systems to ease frequency overcrowding and allow interoperability with other jurisdictions, the advantages of new digital technologies are becoming clear.

❖ Culpeper County, Virginia

The most common fully digital system is APCO Project 25, or P25 for short. This system is defined by a set of open standards that allow any manufacturer to produce P25-compatible hardware. It was intended to become the standard for public safety radio systems and as more of them are installed, a "snowball effect" is starting to appear.

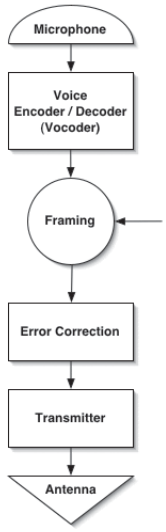
Culpeper County has voted to purchase a $6.5 million public safety radio system without going through a bidding process. They will buy a Motorola Smartzone system without examining other technologies, making them immediately compatible with nearby counties in northern Virginia. Other options were expected to cost even more money, in part to make modifications that would allow interoperability. Since many jurisdictions in northern Virginia, Maryland, and the District of Columbia are already using Motorola 800-MHz systems, Culpeper County believes it is most prudent to purchase a compatible system.

They plan to share radio controller equipment located in adjacent Fauquier County. Besides saving money, this sharing arrangement will allow each county dispatch center to serve as a backup for the other, in case of emergency or other difficulties.

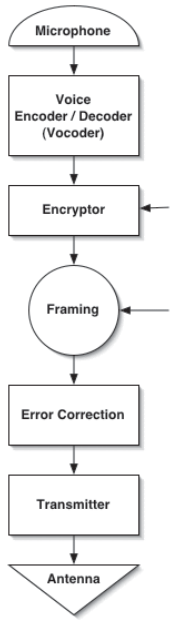
This new system will replace their old VHF system. Four existing towers, plus two proposed antennas will provide coverage for about 95% of the county. One of the new antennas would be on top of a new dispatch center located at the intersection of Routes 229 and 729. Nearly 800 new radios will be issued when the system goes on-line a year from now.

At the present time the Culpeper County Sheriff is on 39.42 MHz and County Fire can be heard on 33.72, 33.82 and 33.88 MHz.

Digital Voice Transmission
(unencrypted)



Digital Voice Transmission
(encrypted)



❖ Oakland County, Michigan

While APCO Project 25 is a popular open standard, another digital system being sold to public safety agencies is called OpenSky from Virginia-based M/A-COM Wireless Systems. OpenSky is a proprietary system and does not directly interoperate with other radio systems or equipment vendors, although M/A-COM also sells a product called NetworkFirst that promises to fix that problem. The State of Pennsylvania has been working to install a statewide OpenSky system for several years now but progress has been very slow.

Despite the problems in Pennsylvania and the overwhelming trend toward Project 25, Oakland County in southeast Michigan is transitioning their existing Motorola Type II analog system to a M/A-COM OpenSky network. The county expects to complete their transition (assuming everything works correctly) before June. When the transition is complete the old Motorola system will be shut down.

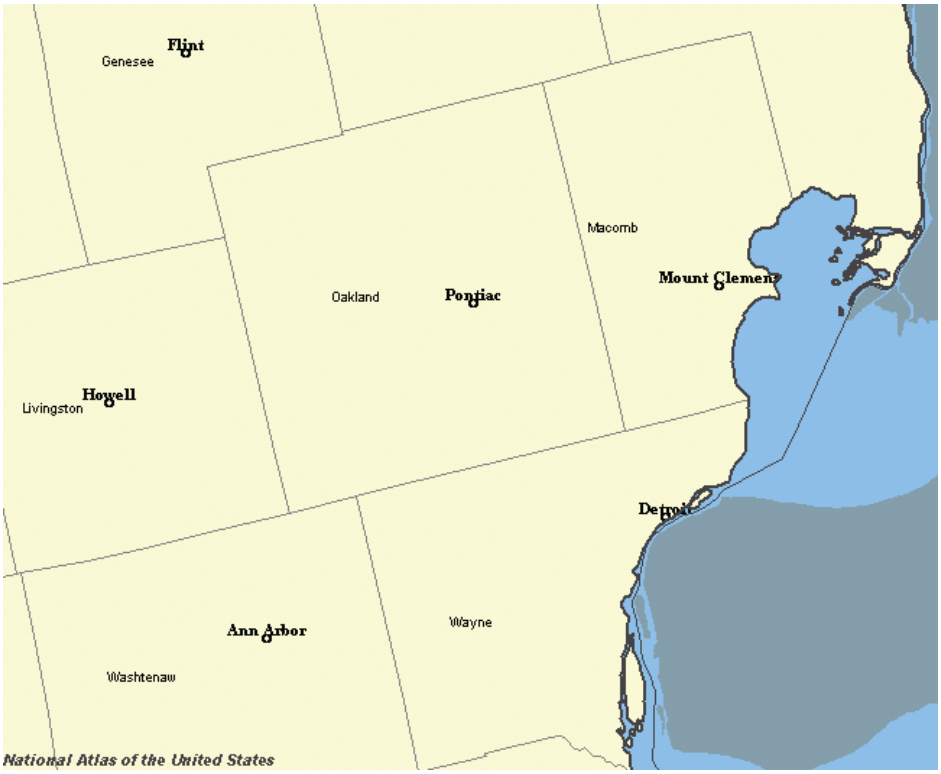
Frequencies for the current system are: 851.0625, 851.4625, 852.0625, 852.1125, 852.2125, 852.4625, 853.4625, 853.5375, 854.0625, 854.4625, 854.5375, 855.0625, 855.4625 and 856.0625 MHz.

16	001 (North)	Sheriff Dispatch
48	003 (South)	Sheriff Dispatch
80	005	Sheriff Dispatch (East)
112	007	Sheriff Dispatch (West)
144	009	Rochester Hills Dispatch
304	013	Sheriff Car-to-Car (North)
336	015	Sheriff Car-to-Car (South)
368	017	Sheriff Car-to-Car (East)
400	019	Sheriff Car-to-Car (West)
432	01B	Rochester Hills Car-to-Car
688	02B	County Tactical 1
720	02D	County Tactical 2
752	02F	County Tactical 3
784	031	County Tactical 4
816	033	County Tactical 5
848	035	County Tactical 6
880	037	County Tactical 7
912	039	County Tactical 8
944	03B	County Tactical 9
976	03D	County Tactical 10
1008	03F	Sheriff Marine Division
1111	045	Severe Weather Information
1136	407	Patrol Emergency
3248	0CB	County Department of Public Works
4880	131	County Building Safety
8016	1F5	County Mutual Aid with Lapeer County
11400	2CB	Pontiac/Oakland Airport Tower
10416	28B	All Hospitals
10640	299	Oakland General Hospital
10704	29D	Providence Novi Hospital
11024	2B1	Royal Oak Township Fire Department
11216	2BD	Waterford Township Police Dispatch
11248	2BF	Waterford Township Police Information
11536	241	Wixom Police Department
12016	2EF	Pontiac Police Dispatch
12048	2F1	Pontiac Police Car-to-Car
12336	303	Pontiac Fire Dispatch
28400	6EF	West Bloomfield Township Police 1
28432	6F1	West Bloomfield Township Police 2
57760	E1A	Mutual Aid

❖ Macomb County, Michigan

This month Macomb County, just to the east of Oakland County, begins construction of a countywide public safety radio system. Many of the police radios now in use there are more than 30 years old and do not work with neighboring jurisdictions. Under the $13 million plan, nine repeater sites will be completed by next summer and linked to a dispatch center by October 2005. Interconnection to the Michigan State Police system would be done by April of 2006, at which point the Macomb County Sheriff's Office would link up.

The Sheriff's Office currently dispatches on 460.400 MHz. They also use 460.250 and 460.875



MHz, as well as 460.150 for Car-to-Car. You can hear County Fire (and some townships) on 154.130 MHz. Other fire frequencies are 154.070 and 154.335 MHz.

Because county voters defeated a phone tax proposal at the polls last year, township and city governments will have to purchase their own radios and dispatch services in order to use the new system.

Within Macomb County, Shelby Township is already part of the Michigan Public Safety Communication System, which is a statewide Project 25 network. The City of Warren is operating a Motorola analog trunked system licensed for seven frequencies: 851.4875, 852.4875, 853.4875, 854.4875, 855.4875, 856.037 and 856.0875 MHz. Warren uses talkgroups 16 and 48 (hex 001 and 003) for Police dispatch and 688 (hex 02B) for Fire dispatch. The City of Centerline also uses the system, with Police dispatch on talkgroup 80 (hex 005) and Fire on 1744 (hex 06D).

❖ Detroit, Michigan

Just to the south of Macomb County is Detroit, the largest city in Michigan. Ira in Royal Oak, Michigan, sent in these frequencies for the Detroit Police and Fire Departments. He also notes that Pleasant Ridge, Michigan, is using 154.040 and is dispatched by the Berkley Police Department.

Detroit Police Department
(UHF frequencies use PL tone of 114.8)

453.350 F-1 Dispatch Zone #1 - Precincts 1 (Downtown), 3 (Vernor), 4 (Fort & Green)
453.750 F-2 Dispatch Zone #2 - Precincts 2 (Schaefer), 10 (Livernois)
453.300 F-3 Dispatch Zone #3 - Precincts 7 (Mack), 13 (Woodward), 16 (City of Highland Park), Belle Isle (Harbormaster), New Center, Masonic Theater areas
453.800 F-4 Dispatch Zone #4 - Precincts 11 (E.Nevada & Bloom), 12 (Palmer Park)
453.550 F-5 Primary Car-to-Car, Special Events
453.250 F-6 Dispatch Zone #5 - Precincts 6 (Plymouth), 8 (Grand River)
453.700 F-7 Dispatch Zone #6 - Precincts 5 (E. Jefferson), 9 (Gratiot)
453.325 F-8 Major Crimes Desk (i.e. Homicide Desk, Sex Crimes, etc.)
453.375 F-9 Alternate Tactical, Car-to-Car, Precinct to Car, used when F-5 is busy
453.425 F-10 Gaming Administration Unit command channel
453.875 F-11 Mobile Common for city-wide Tactical Services Units (including K-9 units), Also used by Viper Units (Housing Support section), and Gang Squad
453.925 F-12 Command Channel, Phone patch, sometimes Mayor's Security
453.975 F-13 "P" Channel - Surveillance, Detectives
453.975 F-14 "P" Channel - Surveillance, Detectives - talk around (repeat off)
453.775 F-15 "Q" Channel - 1st Precinct Special Operations Section, Civic Center Detail
453.775 F-16 "Q" Channel - 1st Precinct Special Operations Section - talk around (repeat off)
453.725 DPD Cultural Center Base. Institute of Arts, and cultural center area in 13th precinct

154.860 Surveillance (Simplex)
159.090 paging (mostly digital, some voice)
155.865 MEPS (intercity car to car)
460.275 Reserves

Detroit Fire Department

154.310 F1 Dispatch city wide PL=77.0
153.950 F2 Input to 154.310 repeater
153.890 F3 Special events
154.400 F4 Rig-to-rig PL=77.0

Detroit Fire Department Emergency Medical Services

155.160 Dispatch PL=97.4
155.325 Car-to-car PL=97.4

NOTICE: It is unlawful to buy cellular-capable scanners in the United States made after 1993, or modified for cellular coverage, unless you are an authorized government agency, cellular service provider, or engineering/service company engaged in cellular technology.

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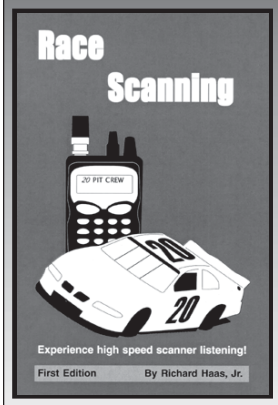
Race Scanning



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- Racing flags
- Choosing a scanner
- Tips and tricks
- Racing frequencies

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❖ Burbank, California

As a scanner listener, it's important to occasionally check frequency bands that you might not ordinarily monitor. You might just find some interesting activity in places you don't expect.

Last November the city of Burbank, California, received approval from the Federal Communications Commission (FCC) to operate a UHF public safety radio system on frequencies that are normally used for non-public safety purposes. Burbank is a city of 100,000 residents that is perhaps best known as home to several television and motion picture studios. The city applied for nine frequencies in the UHF band to ease congestion on their current radio system during busy periods. The system serves a variety of agencies, including police, fire, public works, water, power, and animal control.

One of the frequency pairs Burbank asked for, 470.050 MHz and 473.050 MHz, is normally set aside as part of a "guard band" between two different types of services, namely private land mobile radio and paging. (Guard bands are typically used to separate different services and users – a kind of safety zone that minimizes the chances of one service interfering with another). Technically this frequency is not to be used for public safety, which is why Burbank applied for a waiver.

Fortunately for Burbank, there are no paging license holders in the Los Angeles area using the frequencies 470.0375 and 473.0375, which is the nearest "standard" channel pair. As it turns out, that particular pair is already used by the South Bay Regional Public Communications Authority for public safety. Also, the City of Pomona is licensed to use 470.0500 and 473.0500 MHz for public safety. These current licensees have agreed that it would be okay with them for Burbank to use the frequency pair, since the chance of interference is so small.

Keep this kind of thing in mind as you're hunting for new frequencies. The FCC has granted many of these kinds of waivers, so you might try searching in bands that at first glance might not sound too promising.

❖ Louisville, Kentucky

After joining the city and county police department operations a year ago, the city of Louisville and Jefferson County don't expect their public safety radio systems to be interconnected until 2006. They currently use different systems that cannot directly communicate with each other. In addition to police, fire and emergency medical services, the radio system is expected to serve local disaster agencies and the emergency rooms of some larger hospitals. A single facility will serve as an integrated dispatch center for all of the different agencies and departments.

The expected cost for this system is somewhere between $50 and $60 million. Louisville currently has about half of the necessary funds. Some of this money came from Congress when they set aside $725 million for thirty metropolitan areas designated "at high risk" for terrorist attacks. Although Louisville may not be the first city you think of when considering terrorism, local officials point to nearby chemical industries and automobile production plants as potential targets.

The combined Louisville/Jefferson County Motorola hybrid system currently operates on the following frequencies:
856.2125, 856.2625, 856.4625, 856.9375, 857.2125, 857.2625, 857.4625, 857.9375, 858.2125, 858.2625, 858.4625, 858.9375, 859.2125, 859.2625, 859.4625, 859.9375, 860.2125, 860.2620, 860.4625 and 860.9375 MHz.
The proper fleetmap to use is:
S0, S0, S4, S4, S4, S4, S4, S4.

❖ Orange County, California

Dan,

I need your help! This is the system my local police department uses. What do I need so I can listen? It's encrypted.

System Name: Orange County APCO-25 Smartzone

Location: Orange County, California

*All the law enforcement dispatch and tactical talk-groups are ASTRO IMBE *encrypted*.*

- Shut Out in California

Orange County, California, like Jacksonville, Florida, has decided to encrypt the voice traffic on their digital radio system. The short answer is that this means Project 25 scanners like the Bearcat 250D and the Radio Shack PRO-96 will not be able to monitor those particular transmissions.

Analog systems may make use of some simple scrambling methods, which technically are not encryption at all. The most common is called *frequency inversion*, where segments of the voice band are switched around. This results in the voice sounding like Donald Duck, but with some practice you can readily make sense of it. Some scanners even have optional accessories that reverse this type of scrambling.

Encryption used in digital systems tends be more secure than that. The voice encoder/decoder in a digital system outputs a block of digital information that represents the sounds coming into the microphone. Encryption takes that digital block and mixes the contents based on a *key*. The mixed block is then transmitted. Anyone listening at that point will receive the mixed block and be unable to make sense of it. However, a receiver with the same key as the transmitter is able to undo the mixing and return the block to its original form.

Fortunately for scanner listeners, encryption is just not that common, although that's little comfort for listeners in Orange County or Jacksonville. Because encryption modules for radios and repeaters cost extra money, most jurisdictions have decided to use their tax money on other things.

However, for those agencies that do want to encrypt, there are a limited set of choices. EDACS has encryption options for both control channels and digital voice traffic channels, although the control channel option is more to prevent the use of unauthorized radios rather than frustrating scanner listeners. Motorola has developed two forms of encryption for their products, one based on a proprietary algorithm and the other on a Federal specification known as the Data Encryption Standard (DES).

DES was invented back in the 1970s and since then has been subjected to a great deal of scrutiny by the cryptographic community. DES uses keys that are 56 bits in length, which is considered rather short these days. It is possible (and has been done) to build a very fast computer that can crack a DES-encrypted message using "brute force" by trying out all possible keys.

This type of weakness motivated the Federal government, in the form of the National Institute of Standards and Technology (NIST), to select a replacement for DES. Their choice, termed the *Advanced Encryption Standard* (AES), is now beginning to supplant DES in many applications and is recommended for future designs. Although AES has a longer key than DES, which usually equates to more security, the AES algorithm has not been subjected to nearly as much analysis and is therefore not yet entirely trusted by system designers.

Besides the strength of the algorithm itself, encryption relies on keys. These keys must be kept secret and should be changed on a regular basis. Keys should also not be easy to guess. There are rumors in the cellular telephone community that the encryption keys used in some digital cellular systems follow a simple pattern, implying that trying out a few different possibilities may allow an unauthorized party to monitor encrypted traffic.

I suspect that agencies using encryption may not be as vigilant as they should about these *key management* issues, and would not be surprised to hear about underground or "gray market" decryption devices or programs. Since this type of activity is against the law in the United States, such radio hacking would necessarily be centered in Canada or elsewhere.

❖ Utah and the Future

Historically, voice has been the only means of communication between public safety personnel as they go about their duties. In recent years some police agencies have added data connectivity to their patrol cars, allowing officers to directly access license, registration, warrant and other databases. The next step in this progression is to deliver live video from police and fire vehicles.

The State of Utah has also announced plans to integrate public safety communications under a statewide "Wireless Integrated Network" (UWIN). When complete, UWIN will provide voice, data and video connectivity to law enforcement, fire, and other emergency service agencies.

The first phase, establishing the voice links between these agencies, is expected to be ready by July. The second phase involves connecting highway video systems and police car cameras to dispatch centers, allowing supervisors to observe activity in real-time rather than wait for videotape. It's not clear when this will become operational, however, since the technical challenges of sending video transmissions are more complex than voice.

This type of system will open a new world to scanner users – being able to see as well as hear safety personnel as they go about serving and protecting the public. Television programs such as "COPS" that feature video taken from the scene have been popular for many years. Imagine receiving those kinds of images live on your scanner as the events unfold.

Hopefully you've gotten a taste of the variety of radio systems and technologies this column will cover in the future. Keep those e-mails coming to *danveeneman@monitoringtimes.com* , and check my web site at **http://www.signalharbor.com** for more information. Until next time, happy scanning!

John David Corby, VA3KOT
johncorby@monitoringtimes.com

New Year, New Frequencies

MT reader Ira Paul from Detroit wrote to *Scanning Canada* recently to share the frequencies he has found for the Windsor Casino. The American city of Detroit, Michigan, and the Canadian city of Windsor, Ontario, face each other across one of the busiest waterways in North America – the Detroit River. The Detroit skyline looks most imposing from the riverwalk on the Windsor side of the river. The much smaller city of Windsor presents a less appealing facade from the US side, but many Americans are tempted over the Ambassador Bridge by the casino on the Canadian side.

Meanwhile, Great Lakes shipping passes under the bridge en route from the upper lakes to Lake Erie. These giant freighters are bound for Ohio ports on the southern shore of Lake Erie, or Buffalo, New York, at the eastern end of the lake. Many others are en route for Canadian inland waters or the Atlantic Ocean and go on through the Welland Canal (by-passing Niagara Falls) to Lake Ontario and the St Lawrence Seaway.

Great Lakes shipping passing out of the Detroit River into Lake Erie sails by Pelee Island – the southernmost point in Canada, on the same latitude as California. Check the marine bands for action while in the area, and remember – if you are tempted to take your scanner into the casino you may arouse the unwanted attention of the smiling, fun-loving folks in the security department.

Windsor Casino
LTR trunked system frequencies:
858.8125 859.0625 860.2125
860.4625 860.7125
LTR trunk groups:
0171XX series - slot attendants
0131XX series - maintenance staff
0091XX series - security

Ira also visited Windsor Slots (raceway) with his Scout frequency counter to sleuth the frequencies used there. Checking the recorded frequencies on his scanner, he determined that only three frequencies are used at the facility. Ira reported that all three frequencies are simplex channels:

458.4875	Slot attendants
458.1625	Security
458.9875	Maintenance

New Toronto Airport Terminal Radio System

The Greater Toronto Airports Authority (GTAA) is managing a $3.3 billion project centering on the construction of a giant new terminal building (temporarily referred to as "T-New"). This huge building, still under construction, will replace the older terminals 1 and 2. Enough concrete will be used in the construction to build two CN Towers and enough steel will be used to build more than three Eiffel Towers.

A new radio system has been installed to handle the huge volume of business that the terminal will have to contend with when it is open. The system is so complex that the technologists at GTAA put it under a rigorous stress test (with the eager help of a small group of local hams) to check its ability to handle extreme loads. The overnight test was a complete success and commissioning of the new system is expected to take place on schedule.

The system comprises both digital and trunked analog elements and will use frequencies in the 800 and 900 MHz range. One of the hams involved in the stress test reported to *MT* that hundreds of small antennas have been mounted throughout the giant structure to ensure that there are no dead zones in the terminal building.

ILS Landing Tests

Still at Toronto's Pearson International Airport, *MT* readers who hang out around the airport perimeter with their scanners may have noticed some unusual maneuvers in late October last year. Nav Canada (the organization that maintains Canada's air traffic navigation systems) was conducting an ILS (Instrument Landing System) test that involved repeatedly flying a Challenger jet, with wheels up, over runway 33L every few minutes.

You might be excused if you thought a security incident was in progress, but now you know the rest of the story. ILS frequencies can be found at the bottom end of the air band. Pearson uses 109.100, 109.300, 109.700, 110.300, 110.500, 110.950 and 111.500 MHz. The ILS beacons identify using slow speed Morse Code and can usually only be heard while in the direct flight line of the runway they serve.

Tighter Security at Pearson

Opportunities for scanner owners to monitor radio traffic in the vicinity of Toronto's Pearson airport are narrowing all the time. A perimeter road has been built all the way around the outer fence and it is patrolled constantly by groundside security vehicles. A recent incident involving an El Al plane that was forced to divert from Toronto to nearby Hamilton airport, to avoid a perceived threat from shoulder-launched missiles, re-emphasized security concerns.

Security at Hamilton is less visible and monitoring sites are readily available. It will be interesting to see if this changes. If similar incidents occur in the future, readers in the southern Ontario area should monitor the following frequencies for information: Hamilton tower on 125.000 MHz and Toronto Center (Hamilton region) on 133.300, 135.625 and 290.800 MHz.

Annapolis Royal Police

This month's picture was sent in by *MT* reader and repeat contributor Nick Robinson of New Brunswick. It shows an Annapolis Royal Police vehicle leading a parade. The Chevrolet Lumina is equipped with a standard Annapolis Royal VHF radio system. The antenna, barely visible in the picture, is a whip mounted on top of the roof lights.

Nick tells *MT* that the Annapolis Royal Police Service uses 153.59 MHz for dispatch and 158.88 MHz for all other communications. Dispatch is done through the Yarmouth RCMP (Royal Canadian Mounted Police) telecommunications center.

Thank You Readers

Contributions to *Scanning Canada* continue to pour in from *MT* readers on both sides of the border. As always, your submissions are very welcome and the *ScanCan* thank you card will be in the mail to you if you include your snail mail address.

Until next month, when Canada's meteorologist rodent "Wiarton Willie," the albino groundhog, makes his annual weather forecast, here's wishing you break squelch on some more brand new frequencies for the new year.

Hugh Stegman
hughstegman@monitoringtimes.com
www.ominous-valve.com/uteworld.html

Maritime Public Coastal Radio: A Survey

Every time another commercial maritime radio network shuts down, the reason given is that competition from newer communication systems has doomed the whole service to ever-declining traffic volume. Indeed, a quick scan will show how quiet the bands are getting.

This column decided to look more deeply into the situation. An attempt was made to investigate as many as possible of the best-known public stations, most of which could be heard worldwide in, say, the 1980s. Many have most likely been overlooked, and so we welcome additions and corrections. Note that "coastal" is the regulatory term for this service, and that in fact such stations as Bern and Moscow are nowhere near oceans.

On this list, station names are the commonly agreed-upon ones, and "active" status means that at least a calling marker was reported in the past months. A problem exists with the many Mexican stations – the complete list of which would be a column in itself. While we've never seen any notice of their closing, they're never heard here and never logged anywhere else.

Most station closures seem to have come from the privatization or deregulation of telephone companies, which have evolved into global players unable to justify such marginal services as maritime radio. This has happened in the United States (AT&T and MCI), the UK (BT), Australia (Telstra), and several other countries. Outside the cutthroat telephone industry, the trend appears more to be toward automating stations than closing them.

Coastal Station Status List

Call	Name	Country	Status
3AC	Monaco Radio	Monaco	Active
4XO	Haifa Radio	Israel	Active
5BA	Nicosia Radio	Cyprus	Active
7TF	Boufarik Radio	Algeria	Active
8PO	Bridgetown Radio	Barbados	Absorbed into Globe digital
9VG	Singapore Radio	Singapore	Navtex only
A7D	Doha Radio	Qatar	Active
A9M	Bahrain Radio	Bahrain	Absorbed into Globe digital
CBV	Playa Ancha Radio	Chile	Active
CLA	Havana Radio	Cuba	Active
DAN	Norrdeich Radio	Germany	Closed 1998
DAO	Kiel Radio	Germany	MarineNet e-mail only
EAD/EHY	Madrid Radio	Spain	EAD is active
ESA	Tallinn Radio	Estonia	Active; ex-UAH
FFL/FFT	St. Lys Radio	France	Closed 1998
GCC	Cullercoats Radio	UK	Navtex only
GKA-Y	Portishead Radio	UK	Closed 2000
GKR	Wick Radio	UK	Closed 2000
GKZ	Humber Radio	UK	Closed 2000
GLD	Land's End Radio	UK	Closed 2000
GNI	Niton Radio	UK	Navtex only
GNF	North Foreland Radio	UK	Closed 1991
GUD	Jersey Radio	UK	Active
HEB	Bern Radio	Switzerland	Absorbed into Globe digital
HEC	Bern Radio	Switzerland	Active
HLx	Seoul Radio	S. Korea	Active (Many last letters)
HPP	Intelmar Radio	Panama	Active
HZH	Jeddah Radio	Jordan	Active
IAR	Roma Radio	Italy	Active
J2A	Djibouti Radio	Djibouti	Active
JBO	Tokyo Radio	Japan	Active
JCS	Choshi	Japan	Closed 1996
JFC	Fisherman's Radio, Misaki	Japan	Active on 8616 & 22599
JOS	Nagasaki Radio	Japan	Active
KEJ	Hoolehua Radio (HI)	USA	Absorbed into Globe digital
KFS	Palo Alto Radio (CA)	USA	Moved; Globe uses callsign
KHF	Agana Radio	Guam	Absorbed into Globe digital
KKL	Republic Radio (WA)	USA	Active; MarineNet member
KLB	Seattle Radio (WA)	USA	Active, affiliated with WLO
KLC	Galveston Radio (TX)	USA	Active?
KMI	High Seas, SF (CA)	USA	Closed 1999
KPH	San Francisco Radio	USA	Moved; Globe uses callsign
LFI	Rogaland Radio	Norway	Absorbed into Globe digital
LPD	Genl. Pacheco Radio	Argentina	Some services active
LPL	Genl. Pacheco Radio	Argentina	Voice loop no longer heard
LSD836	Argentina Radio	Argentina	Absorbed into Globe digital
LZW	Varna Radio	Bulgaria	Active
OST	Oostende Radio	Belgium	Active
OFJ/OHG	Helsinki Radio	Finland	Closed 1999
OXZ	Lyngby Radio	Denmark	Active
PCH	Scheveningen Radio	Netherlands	Closed 1999
PKX	Djakarta Radio	Indonesia	Active
PPO	Olinda Radio	Brazil	Active
PPR	Rio Radio	Brazil	Active
RRR34	Moscow Radio	Russia	Active
SAB	Goteborg Radio	Sweden	Absorbed into Globe digital
SAQ	Grimeton Radio	Sweden	Museum with RF alternator
SDJ	Stockholm Radio	Sweden	Active
SPA	Gdynia Radio	Poland	Active
SPE/SPO	Szczecin Radio	Poland	Active
SVA/SVN	Athens Radio	Greece	Repl. by SVO, Olympia Radio
TAH	Istanbul Radio	Turkey	Active
UAH	Tallinn Radio	Estonia	Active; now ESA
UAT	Moscow Radio	Russia	Active
UBF	St. Petersburg Radio	Russia	Active
UCE	Arkhangelsk Radio	Russia	Active
UDK	Murmansk Radio	Russia	Active
UFN	Novorossiysk Radio	Russia	Active
UFL/UFZ	Vladivostok Radio	Russia	Active
UIW	Kaliningrad Radio	Russia	Active
UTQ/UWS	Kiev Radio	Ukraine	Active
UQK	Riga Radio	Latvia	Now YLN
URL	Sevastopol Radio	Russia	Active
USO	Izmail Radio	Russia	Active
USU	Mariupol Radio	Ukraine	Unknown
UDE/UTT	Odessa Radio	Ukraine	Unknown
UVA	Gelendzhik Radio	Russia	Active
V5W	Walvis Bay Radio	Namibia	Active; ex-VSW
VCT	Tors Cove Radio (NFD)	Canada	Absorbed into Globe digital
VIA	Adelaide Radio	Australia	Closed 1993
VIB	Brisbane Radio	Australia	Closed 2002
VID	Darwin Radio	Australia	Closed 2002
VIM	Melbourne Radio	Australia	Closed 2002
VIP	Perth Radio	Australia	Absorbed into Globe digital
VIS	Sydney Radio	Australia	Closed 2002
VIT	Townsville Radio	Australia	Closed 2002
VRX	Hong Kong Radio	Hong Kong	Active
VZX	Penta Comstat	Australia	Moved 1998; active
WAH	St. Thomas Radio	USVI	Active
WCC	Chatham Radio (MA)	USA	Moved; Globe uses callsign
WFN	Jeffersonville Radio(IN)	USA	Active
WLC	Rogers City Radio (MI)	USA	Active; MarineNet member
WLO	Mobile Radio (AL)	USA	Active, offers many svcs
WMH	Baltimore Radio (MD)	USA	Closed
WNU	Slidell Radio (LA)	USA	Absorbed into Globe digital
WOM	High Seas, Miami	USA	Closed 1999
WOO	High Seas, New York	USA	Closed 1999
WPC	SeaWave (NY/NJ)	USA	New station, all e-mail
XDA	Radiomex	Mexico	Active?
XFC	Cozumel Radio	Mexico	?
XFL	Mazatlan Radio	Mexico	?
XFM	Manzanillo Radio	Mexico	?
XSG	Shanghai Radio	China	Active
XSQ	Guangzhou Radio	China	Active
XSV	Tianjin Radio	China	Active
XSX	Chilung/Keelung Radio	Taiwan	Active
YLN	Riga Radio	Latvia	Active; Ex-UQK
YQI	Constanta Radio	Romania	Active
ZLA	Awanui Radio	New Zealand	Absorbed into Globe digital
ZLB	Awarua Radio	New Zealand	Closed 1991
ZLC	Chatham Islands Radio	New Zealand	Closed; building now phone co.
ZLD	Auckland Radio	New Zealand	Closed 1993; now a museum
ZLW	Wellington Radio	New Zealand	Closed 1993, now a museum
ZSC	Cape Town Radio	S. Africa	Absorbed into Globe digital

Utility World

Utility Logs

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ABBREVIATIONS USED IN THIS COLUMN

AFB ..... Air Force Base
ALE ..... Automatic Link Establishment
AM ..... Amplitude Modulation
ARQ ..... Automatic Repeat Request teleprinting system
ARQ-E3 ..... French ARQ teleprinting system
CAMSLANT .... Communication Area Master Station, Atlantic
CAMSPAC ..... Communication Area Master Station, Atlantic
CW ..... Morse code telegraphy ("Continuous Wave")
DEA ..... US Drug Enforcement Administration
DSC ..... Digital Selective Calling
E7 ..... Russian AM numbers in English, ends "000 000"
E10A ..... Israeli phonetic numbers, callup-only or abnormal
EAM ..... Emergency Action Message
EOC ..... Emergency Operations Center
FAX ..... Radiofacsimile
FEC ..... Forward Error Correction teleprinting system
FEMA ..... US Federal Emergency Management Agency
GMDSS ..... Global Maritime Distress & Safety System
HF-GCS ..... High-Frequency Global Communications System
LSB ..... Lower Sideband
MARS ..... Military Affiliate Radio System
Meteo ..... Meteorological
MFA ..... Ministry of Foreign Affairs
Navtex ..... Navigational Telex
NORAD ..... North American Aerospace Defense Command
PR ..... Puerto Rico
RSA ..... Republic of South Africa
RTTY ..... Radio Teletype
SHARES ..... Shared Resources, US interagency net
SITOR-A ..... Simplex Teleprinting Over Radio, ARQ mode
SITOR-B ..... Simplex Teleprinting Over Radio, FEC mode
UK ..... United Kingdom
Unid ..... Unidentified
US ..... United States
V21 ..... Cuban "Babbler," unintelligible Spanish numbers

All transmissions are USB (upper sideband) unless otherwise indicated. All frequencies are in kHz (kilohertz) and all times are UTC (Coordinated Universal Time). "Numbers" stations (encrypted, usually unidentified, broadcasts thought to be intelligence-related) are identified in () with their ENIGMA station designators, as issued by the European Numbers Intelligence Gathering and Monitoring Association.

490.0 "I"-Niton Radio, UK, Navtex in SITOR-B at 0520. (Patrice Privat-France)

1758.0 OXZ-Lyngby Radio, Denmark, with weather and safety warnings in English and Danish, also on 1767, at 0535. (Privat-France)

2749.0 "Canadian Coast Guard Stephensville," with Mariners Information Bulletin at 0143. (Ron Perron-MD)

4125.0 Shark 09-US Coast Guard Cutter *Campbell*, wkg Herc 00 during search for missing fishing vessel near Nantucket at 0156. (Mark Cleary-SC)

4211.7 L2C-Argentine Navy, Buenos Aires, with SITOR-B coastal weather in Spanish, at 0055. (Bob Hall-RSA)

4333.7 RFVIE-French Navy, Le Port, RTTY marker at 0059. (Hall-RSA)

4426.0 CAMSLANT-US Coast Guard, VA, working Cutter *Juniper*, at 0022. (Cleary-SC)

4521.7 L2C-Argentine Navy, Buenos Aires, with SITOR-B navigation warnings in Spanish, at 0046. (Hall-RSA)

4724.0 Offutt-US Air Force HF-GCS, Offutt AFB, NE, with a 57-character EAM at 0730. (Jeff Haverlah-TX)

5680.0 Kinloss Rescue-UK ground station working Rescue 137, at 1648. (Privat-France)

5690.0 Coast Guard 1720-US Coast Guard aircraft, patch via CAMSLANT to Coast Guard Group St. Petersburg, at 2312. (Cleary-SC)

5696.0 CAMSLANT-US Coast Guard, VA, diverting 93A to a go-fast search, at 1405. (Cleary-SC) NOI-US Coast Guard "Detroit Air," MI, working Coast Guard 6553, at 2130 and 2238. (Rick Baker-OH)

5732.0 Panther-US DEA, Bahamas, working aircraft 25C on a drug operation, at 0220. 53A-Aircraft working Panther regarding contraband, at 2317. (Cleary-SC)

6449.0 PWZ33-Brazilian Navy, Rio de Janeiro, RTTY coastal weather in Portuguese, at 0052. (Hall-RSA)

6491.5 LOR-Argentina Navy, Puerto Belgrano, RTTY weather in Spanish, also on 3175.5, at 0040. (Hall-RSA)

6529.0 The Babbler-Cuban "numbers" in Spanish (V21), typically impossible to understand, at 0415. (Chris Smolinski-MD)

6697.0 Bake Shop-US military, with a 28-character EAM simulcast on 8992, 11244, and 13155, at 0307 and 0337. (Haverlah-TX)

6800.0 FAAZLA-US Federal Aviation Administration, Los Angeles air traffic control center, Palmdale, CA, with ALE sounding at 1530, and on 17487 at 2054. (Perron-MD)

7428.0 TDLFEM-FEMA, sounding in ALE at 1448. (Perron-MD)

7527.0 Foxtrot 33-US Coast Guard aircraft, setting radio guard with CAMSPAC at 2335. (Cleary-SC)

7805.0 WPFJ625-New Hampshire State EOC, Concord, ALE sounding at 1204. PE1TE-Peterborough, NH EOC, ALE sounding at 1352. RO1CH-Rochester, NH EOC, ALE sounding at 1353.CE1NT-Centerville, NH EOC, ALE sounding at 1716. (Perron-MD)

8171.5 T1Z159-US Army, Fort Bragg, NC, calling helicopter R26584 in ALE, at 1928. (Perron-MD)

8280.0 MASCARA-Venezuelan Navy, calling REDJEFE in LSB ALE, at 0740. (Perron-MD)

8298.0 VTP13/14-India Navy, Vishakhapatnam, RTTY marker at 1605. (Hall-RSA)

8413.0 "360"-Unknown station calling "555" in ALE, on the GMDSS Alert frequency, at 1926. (Day Watson-UK)

8500.0 VTH1/5/7- India Navy, Bombay, RTTY marker at 0115. (Hall-RSA)

8912.0 Juliet 23-US Coast guard aircraft, position for CAMSPAC at 2039. 25C-aircraft working Panther at 2137. (Cleary-SC)

8971.0 Commentator 712-US Navy, calling Fiddle (Jacksonville, FL) and Bluestar (Roosevelt Roads, PR) at 1529. (Cleary-SC)

8980.0 CAMSLANT-US Coast Guard, VA, handling a morale patch for "C-7-Y," very rare to hear on Coast Guard frequencies, at 2359. (Allan Stern-FL)

8983.0 Air Force Rescue 973-US Air Force, probably a rescue aircraft, passing position to CAMSLANT at 2031. (Cleary-SC)

8992.0 Fearless-US military, announced a 164-character EAM, simulcast on 6697 and 11244, but then only read the first 149 characters the first time through, at 0012. Navy Crawdad 4-US Navy, trying to raise Offutt at 2112, gave up after 2118. (Haverlah-TX)

9007.0 Canforce 2644-Canadian Forces, patch via Trenton Military to Greenwood Ops, at 2157. (Cleary-SC)

9023.0 Okie Sam-NORAD/US Air Force ground station, Link-11 coordination with Top Dog, probably a US Air Force interceptor, at 2313. (Cleary-SC)

9025.0 Goliath Echo-US Air Force AWACS (Airborne Warning And Control System) aircraft, in an ALE-initiated patch to Tinker AFB, at 0017. (Cleary-SC)

9047.0 062NHQCAP-US Civil Air Patrol headquarters, Maxwell AFB, AL, sounding in ALE at 2042. (Perron-MD)

9110.0 NMF-US Coast Guard, Boston, FAX weather chart at 2056. (Watson-UK)

9198.0 TAC-Chilean Navy, calling 23F in LSB ALE, also on 12103, at 0115. (Perron-MD)

9462.0 453FEMAUX-Ohio State EOC, Columbus, sounding in ALE at 1703. (Perron-MD)

9906.0 CLC51-Venezuelan Army communication center, calling PCRM5, maintenance, in ALE at 0006. (Perron-MD)

9996.0 RWM-Standard time station, Moscow, Russia, with dead carrier until 1109, then CW identifier until 1110, then into time pips at 1101. (Watson-UK)

10100.8 DDK9-Hamburg Meteo, RTTY land synoptic weather observations, at 1324. (Watson-UK)

10115.0 SCLC501-Venezuelan Army communication unit, calling PCRM5, in ALE at 0620. (Perron-MD)

10242.0 TRC-US Customs Service, calling MVX in ALE, at 1401. (Perron-MD)

10244.0 ALG-Algerian oil/gas net, Algiers, sounding in ALE at 2218.

(Perron-MD)

10248.0 8BY-French military, Paris, coded CW marker at 1340. (Watson-UK) *[Formerly M16, withdrawn by ENIGMA because they no longer consider it as true "numbers." -Hugh]*

10373.6 NRLY-US Coast Guard Cutter *Bristol Bay*, calling CGD9 (US Coast Guard District 9, Cleveland OH), in ALE at 1739. (Perron-MD)

10404.6 WPC-Seawave, NJ, CW identifier every 3 minutes in data channel marker, at 1511. (Watson-UK)

10536.0 CFH-Canadian Forces, Halifax, NS, with FAX weather charts at 1517 and 1522. (Watson-UK) CFH, taking an RTTY traffic standby and then into weather, giving other frequencies as 4271, 6496.4, and 13510, at 1544. (Watson-UK) CFH, RTTY storm and gale warnings for big Northeast US storm, at 1951. (Hall-RSA)

10555.0 VMW-Australian Bureau of Meteorology, Wiluna, FAX weather chart at 1945. (Watson-UK)

10588.0 441FEMAUX-FEMA Auxiliary Station, Augusta, ME, sounding in ALE at 1431. (Perron-MD)

10590.0 Unid-Moroccan station calling MEKRAKEFI in ALE, at 0940. C4W-Unknown station in a 39-tone mode, then calling E1Q in ALE, at 1537. (Watson-UK)

10825.0 LECAIRE-French embassy, Cairo, Egypt, calling embassy KHARTOUM, Sudan, in ALE, at 1358. CER41-French MFA, Paris, calling LECAIRE in ALE, at 1503. AMMAN-French embassy, Amman, Jordan, calling CER41, in ALE, at 1500. (Privat-France)

10900.0 MAR-Unknown Moroccan station, calling MERKNESFIX in ALE, at 0951. MARRAKE *[Marrakech? -Hugh]*, calling CER in ALE, at 1433. W1W, calling V6U in ALE, then 39-tone bursts, at 1441. (Watson-UK)

11010.0 ERMRIO-Brazilian Navy, Rio de Janeiro, calling FDEFEN in LSB ALE, at 2023, then every 3 minutes until 2131. (Watson-UK)

11039.0 DDH9-Hamburg Meteo, Germany, RTTY navigation warnings and markers, gave other frequencies as 147.3 and 14467.3, at 0950. (Watson-UK)

11086.5 GYA-UK Royal Navy, Northwood, with a FAX weather chart at 1014. (Watson-UK)

11110.0 REARCMD-Possible US Army, calling FWDCMD in ALE, at 1916. (Perron-MD)

11175.0 Navy 50515-US Navy aircraft, working a weak HF-GCS station (might have been Ascension), for a patch at 0807. Lockheed Mart-unknown aircraft *[Garbled "Lockheed Martin?" -Hugh]*, calling Yokota Air Base (Japan) and Offutt HFGCS, no joy from either, and gone at 1602. Jackl 74-US Air Force C-130 (self-identified), brief patch via Andrews HF-GCS to Kirtland Dispatch, at 1908. (Haverlah-TX) Andrews-US Air Force HF-GCS control station, radio check with Navy 515, at 1413. (Baker-OH)

11220.0 Andrews-US Air Force, sending encrypted data to Acid Rock at 2001. (Cleary-SC)

11232.0 Rescue 909-Canadian Forces rescue aircraft, patch via Trenton to Halifax Rescue Coordination Center concerning a shipboard medical emergency, at 2220. (Cleary-SC)

11244.0 Sandusky-US military, 28-character EAM at 2354. Offutt-US Air Force HF-GCS, Offutt AFB, NE, 20-character EAM "for Hotel Force," probably the annual fall exercise, at 1943. Offutt, simulcasting on 13200, started a 254-character EAM (as announced), but was taken out by the magnetic storm at 2041. (Haverlah-TX) *[The extreme geomagnetic storm of 10/29 was one of the largest ever observed, and completely trashed shortwave. -Hugh]*

11440.0 OSN-British Signals unit, calling MSN2, in ALE at 2205. (Perron-MD)

11447.0 Unid-Egyptian diplomatic, Arabic operator chat in SITOR-A, at 1607. (Watson-UK)

12109.0 Reach 381-US Air Force Air Mobility Command, patch via Andrews to Hilda Global, at 2214 (Cleary-SC)

12191.0 SCLC501-Venezuelan Army, calling PCRM5, in ALE at 0010. (Perron-MD)

12215.0 The English Man-Russian intelligence AM "numbers" (E7), callup "2 283 283 283 2," at 1700. (Privat-France)

12437.0 ERMRIO-Brazilian Navy, Rio de Janeiro, calling FDEFEN, Frigate *Defensora*, in ALE at 0101. (Perron-MD)

12546.0 CANCO-Venezuelan Navy, calling BNARCO, Amrio naval base, in LSB ALE at 1107. (Perron-MD)

12560.0 UCOK-Russian vessel *Pioneer Kazakhstana*, calling Arkhangelsk Radio in SITOR-A, at 0930. (Privat-France)

12562.5 UAUD-Russian vessel *Marshall Krylov*, working Kaliningrad Radio in RTTY, at 0935. (Privat-France)

12577.0 UIOJ-Russian vessel *Akvanavt*, calling Lyngby Radio in DSC, at 1330. (Privat-France)

12579.0 NRV-US Coast Guard, Guam, with a SITOR-B PAN PAN (urgency) hurricane warning, at 0740. (Hall-RSA)

12612.5 UFZ-Vladivostok Radio, Russia, working unknown ship in SITOR-A, at 0748. (Hall-RSA)

12710.5 PWZ33-Brazilian Navy, Rio de Janeiro, RTTY weather in Portuguese, at 0645. (Hall-RSA)

12710.7 PWZ33-Brazilian Navy, Rio de Janeiro, RTTY test loop at 1926. (Hall-RSA)

13907.0 25C-Drug interdiction task force aircraft, position for Panther at 0118. (Cleary-SC)

13155.0 Angry Man-US military, with a 28-character EAM simulcast on 8992 and 11244, at 1855. (Haverlah-TX)

13306.0 New York-North Atlantic oceanic air control (net NAT-A), working Martin Air 645 at 1458. New York, working Congo 01 at 1502. (Baker-OH)

13506.0 PCRC3-Venezuelan Army, calling CLC32 in ALE, at 0007. (Perron-MD)

13200.0 Reach 208-US Air Force, patch via Andrews HF-GCS to Travis AFB command and meteo, at 2015. (Cleary-SC)

13927.0 Denver 24-Unknown US military aircraft, morale patch to North Dakota via AFA1NO (US Air Force MARS, PA), at 2139. (Cleary-SC)

14780.0 NEBRSL-Brazilian sailing training ship *Brasil*, calling ERMBEL, Belem, in ALE, at 1130. (Privat-France)

14790.0 COFFRI1-Venezuelan Navy, calling DIVIMCO1, in LSB ALE at 0255. (Perron-MD)

15094.0 AAT3BFMARS-US Air Force MARS, acting as SHARES control station, sounding in ALE at 1156. (Privat-France)

16014.0 Unid-French Forces, with ARQ-E3 message to RFFISYC (French Navy, Paris), RFFKA (Brest), RFGW (MFA, Paris), RFFINDI (vessel *Alindien*), RFFXOC (Ministry of Defense, Paris), RFQPMVD (Djibouti), RFVXL (La Reunion), RFFMVB, (Toulouse), RFVIC (Le Port), and RFFKC (Brest), at 1343. (Hall-RSA)

16806.5 L2C-Argentine Navy, Buenos Aires, SITOR-B weather in English, at 1516. (Hall-RSA)

16988.0 CTP-Portuguese Navy, Lisbon, RTTY marker at 0856. (Watson-UK)

17146.4 NMG-US Coast Guard, New Orleans, FAX weather chart, at 1835. (Watson-UK)

17441.5 5YE-Nairobi Meteo, RTTY markers at 1520. (Hall-RSA)

17988.0 TISCOM-Possible US Coast Guard, VA, sounding in ALE at 0822. (Perron-MD)

18003.0 HIK-US Air Force, Hickam AFB, HI, sounding in ALE at 2129. (Perron-MD)

18296.7 RFQP-French Forces, Djibouti, ARQ-E3 circuit test message, at 1540. (Hall-RSA)

18396.0 LECAIRE-French embassy, Cairo, calling embassy ABUDHABI, United Arab Emirates, in ALE, at 1052. ADDISABEBA-Probably French embassy, Addis Abbaba, Ethiopia, calling LECAIRE in ALE, at 1515. (Privat-France)

18571.5 Unid-Probably Tunis Diplomatic, Tunisia, RTTY message in 5-letter code groups, at 1511. (Hall-RSA)

18900.0 CODRU76-Unknown station calling FMP in ALE, at 1549 and 1557. (Watson-UK)

19216.7 RFLI-French Forces, Ft. de France, Martinique, idling in ARQ-E3 at 1630. (Privat-France)

19709.0 ERMNAT-Brazilian Navy, Natal, calling NEBRSL, sailing training ship *Brasil*, in ALE, at 1109. (Privat-France)

20510.0 FNG034-Unknown station calling SNT051, possibly Polish Army, in ALE, at 1405. (Privat-France)

20633.7 RFVI-French Navy, Le Port, idling in ARQ-E3 at 1340. (Privat-France)

23337.0 GUA-US Air Force, Guam, sounding in ALE, followed in the next hour by MPA (Falklands?), ADW (Andrews AFB, MD), ICZ (Sigonella, Italy), IKF (Keflavik, Iceland), JDG (Diego Garcia), 36795 (aircraft), HAW (Ascension Island), OFF (Offutt AFB, NE), and CRO (Croughton, UK), at 1324. (Hall-RSA)

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SITOR-A Still Heard

This month we take a look at a couple of long-time occupants of the HF utility bands still occasionally heard with simple SITOR-A gear, the Swiss Diplomatic Service and the Irish Defense Forces.

❖ Swiss Diplomatic Service

Like many other diplomatic services we've profiled through this column over the years, Swiss HF operations have undergone a dramatic downturn in activity over the recent years. However, there is still a chance to log this venerable HF network using simple receiving equipment since standard SITOR-A is still in use on some selected links while others appear to have migrated to the MIL-188-110A high speed modem triggered by link-protected (encrypted) ALE.

Over the years, MFA Bern has been logged on the following frequencies:

5752.5 5756.9 5773.2 7653.7 7668.5 7677 7678.5 9166.4 9174.5 9179.5 10963.5 10969 10971 10973.5 13571 13585.3 13951 13954.4 13958.4 13965.5 13976 13977 16098 16102 16111 16111.3 16118 18257 18268 18269 18270.5 18271.5 18284 20596

For US listeners, the majority of activity seems to take place daily on 18258.5 kHz with a regular check-in and occasional messages to Washington and Havana. Probably the most distinctive facet of the Swiss operation are their extremely long off-line (5 letter groups) encrypted messages. It is not unknown to come across the MFA in the process of sending a message only to come back several hours later with the groups of five still chugging happily across the screen! Messages end with the trailing signature:

cvcvc
))))
end of message

There are often long "copy to" lists for messages delimited by:

: cacac
list of embassies
: cacac

Communications are shut down with the (ITU conforming) callsign of the sending station, for example "hbd20/3" for the MFA. The "/3" is understood to be the channel that the station is communicating with the MFA on – Bern being capable of operating on eight channels

Routing indicators or addresses for embassies are formed from an abbreviated embassy name suffixed with "am." For example, "budapeam" for the embassy in Budapest, "caireeam" for Cairo, and so on.

The network uses the BMxx series of selective calls. The full series of selcals and embassies routing addresses can be seen by consulting the profile at Utility Monitoring Central (**http://www.chace-ortiz.org/umc**).

❖ Irish Defense Forces

A few months ago we monitored a very weak SITOR-A signal on 9051.5 kHz, leaving the receiver on over the night to collect any traffic in the hope of better copy. Between long periods of selcalling, mostly to the identifier CVXT, there were brief operator exchanges in English and some traffic that was clearly five letter group off-line encrypted. Occasionally, we could hear USB voice too, although under the weak signal conditions it was very hard to make out the origin of the voices.

A query to a few listeners brought a response from Jim K who made the connection with this frequency belonging to the Irish Defense Forces. Since once again, this is a great example of a network still available to listeners with simple SITOR-A gear, we thought we'd profile it in this month's column.

This network actually appears to cover Air Force, Army and Navy (including Fishery Protection) units, and has been heard across the following frequencies:

Navy:
2461.5 2851.5 3201.5 3451.5 4601.5 4751.5 6901.5 7701.5 9051.5 13506.5

Army:
4993.5 6974.3

Air Corps & Navy:
3060.0 5375.0 5690.0 5708.0 5724.0 6682.0 6766.0 8980.0 9020.0 11265.0 13210.0 13250.0 15053.0 15074.0 15912.0 17990.0 18770.0 19770.0

Other frequencies reportedly used by these stations include:
3244.5 3246.0 3830.0 5334.2 5608.5 5785.5 5788.5 5794.0 7364.4 7700.0 7711.0 7714.0 7800.0 9113.0 9116.0 9272.0 9275.0 11405.5 11408.5 12067.6 15981.5 15724.5

The most active units however, have always been those of the Navy, whose HQ uses the callsign "0A" (or more fully PT0A) and uses the selcal XSFC. Various other vessels with callsigns PT13 to PT99 can also be heard and use selcals from the series XVxx and CVxx:

P20 Deirdre	(EIYV)	Patrol vessel
P21 Emer	(EIYX)	Patrol vessel
P22 Aoife	(EIYM)	Patrol vessel
P23 Aisling	(EIYP)	Patrol vessel
P31 Eithne	(EIYS)	Corvette, heli SA365F Dauphin 2
P41 Orla	(EIYQ)	Patrol vessel
P42 Ciara	(EIYT)	Patrol vessel
Tailte	(EIYR)	Patrol vessel
Seabhac		Tug
Fainleog	(MBBZ2)	Passenger craft
David F.	(GSYE)	Passenger craft
Fiachdubh		Passenger craft
Nancy Bet	(EI2328)	Training yacht
Creidne	(EIJK)	Training yacht
Gray Seal	(EIGW)	Lighthouse tender
S. Nessan	(EI2458)	Pilot boat
Shandon	(EI2459)	Tug
Granuaile	(EICG)	Lighthouse tender
Manuel Plana		Escort vessel

All manner of traffic can be seen on this network including fisheries information:

NAVAL SUPERVISORY CENTER - DAILY LOG
PREC-ACTION R | PREC-INFO R | DATE-TIME-MONTH-YEAR 301600A SEP94 | SECURITY CLASS UNCLAS
FROM JLT
TO(ACTION) DELIVERY INDICATOR 78,46,89 SOO OPS
TO(INFO) DKD

DTG	LAT	LONG	IC	REGPORTNO	NA	SO	ACT	B	L-P
30 06:43A	5020	930	7J	VI-5-9055	SP	9	138	N	18/09-28/09
30 07:00A	5828	829	6A	SS-1-2257	SP	0	107	N	19/09-14/10
30 07:12A	5350	1240	7C	GI-4-1839	SP	9	138	N	20/09-29/09
30 07:23A	5340	1410	7C	GI-4-1878	SP	9	138	N	20/09-29/09
30 07:30A	5220	1445	7K	FE-3-1955	SP	55	107	N	30/09-11/10
30 08:00A	5801	930	6A	BI-4-210	SP	10	138	N	03/09-02/10
30 09:21A	4825	933	7J	VI-5-9352	SP	9	129	N	01/10-10/10

IC=ICES; NA=NATIONALITY; SO=SOURCE; ACT=ACTIVITY; B=BOARDED; L-P=LICENSE PERIOD

Take some time to check into this interesting network while you can.

Resources

Swiss Diplomatic Service:
http://www.chace-ortiz.org/umc/mfatext/Switzerl.txt
http://www.eda.admin.ch/eda/e/home.html

Glenn Hauser
P.O. Box 1684-MT, Enid, OK 73702
glennhauser@monitoringtimes.com
www.worldofradio.com

Radio For Peace International Loses Its Buildings

Protracted negotiations with the University for Peace in Costa Rica led nowhere, with the University refusing to compensate RFPI for the value of its building, and proceeding to turn of the water and phones, and two days later, on November 5, the electricity, putting RFPI 7445 off the air. While pursuing legal action in Costa Rica's Supreme Court, RFPI began moving out its furniture and broadcasting equipment to a new location in the mountains, donated by a Costa Rican supporter, Ruddy Seeley. A new office location in downtown San José had already been acquired. It was hoped to resume web streaming shortly, and resume shortwave in a few months after the facility could be rebuilt, with hydro power. Thanks to Franklin Seiberling, Iowa City, for keeping in contact with James Latham and RFPI; the latest info appears on his website **http://copyexchange.com/_wsn/page3.html**

Tropical Band Countdown

When will the last stations disappear from the Tropical Bands? In a presentation to the European DX Council, Anker Petersen, who compiles the Tropical Band Survey, project the present rate of attrition: the number of stations will hit zero around the year 2014, as reported via the NASWA *Journal*.

Dave's Radio Receiver Page

Fortune City having deleted his page without notice or explanation, Dave Zantow has moved his site to **http://www.ticon.net/~n9ewo**

AFGHANISTAN A new 100 kW SW transmitter is being constructed in Kabul, by Basil Broadcast Engineering Consultants India Ltd., financed from Indian aid, according to Keralanext.com — presumably to replace one bombed by the Americans on 8th October 2001, to be completed by March 2004 (Alan Pennington, UK, *DX Listening Digest;* also *Times of India* via Jilly Dybka)

[non] R. Amani, peace broadcaster now on 7350 at 1630-1730 Fris only via Armavir, Russia, 100 kW, 104° degrees (Michael Bethge, Germany, WWDXC Germany)

ALBANIA R. Tirana, B-03 English: to England, Mon-Sat 1945-2000 9510 7210; 2230-2300 7130, 9530; NAm, Tue-Sun: 0245-0300 & 0330-0400 6115 7160 (via Sandipan Basu Mallick, *DX Unlimited*, Howrah, India, BCLNews.it)

ANDAMAN & NICOBAR ISLANDS Last April one of the two exciters in AIR Port Blair's NEC transmitter broke down and since then the SW has only been running 5 kW; awaiting replacement from AIR R&D. SW is only intended for the most northern and southern islands in the long island chain. A dipole array ensures North-South SW coverage. 2330-0300 on 4760, 0310-0340(/0500 Sun) on 7115, 0730-0930(1000 Sunday) on 7115, 1030-1700(1900 on Sat and Sun) on 4760. Mainly in Hindi, only a couple of local English programs; also Sanskrit, Malayalam, Bengali, Nicobari, Telugu, Tamil. Correct address is: AIR, Delanipur, Haddo Post, Port Blair 744102 (Maarten Van Delft, visiting Port Blair, DSWCI *DX Window*)

ANTARCTICA LRA36, 15476, R. Nacional Arcángel San Gabriel, Base Esperanza Army Base at 63-24 S, 53-59 W, celebrated its 24th anniversary on SW Oct. 20; is M-F 1800-2100 with a transmitter ranging from 3 to 10 kW (Gabriel Iván Barrera, Argentina, *Conexión Digital*)

AUSTRALIA RA has a new 250 kW relay via Darwin, English to SAs 1400-1600 on 11750, 290° across Java (Nigel Holmes, RA via Johno Wright, ARDXC) Maybe also reaching Europe. Such an English transmission to S & SE Asia has been a high priority and missing for several years, so it contains special programming, not \\ other RA frequencies, at least on M-F: In the first hour, local news, and the *PM* Program, which is considered so important that it is OK to delay it 6 hours; in the second hour, RA's own production, non-delayed, *Asia Pacific*, and at 1530 an RA feature (Roger Broadbent, with John Westland, RA *Feedback*)

HCJB B-03 English: SAs 75 kW, 307°, 0130-0300 15555, 1230-1700 15390; SPac 50 kW, 120°, 0800-1100 11750. *DX Partyline* is Sat 0830, 1430 (*Observer*, Bulgaria)

AUSTRIA [and non] Radio Austria International B-03 English M-F: 1315 & 1345 17855 AuAs; 1345 6155 13730 Eu; 1610 & 1640 via Sackville 17865 WNAm; Tu-Sa: 0015 & 0045 13730 SAm; 0115 & 0145 9870 LAm, 7325 ENAm. Weekend times shift to 1305 & 1335, 1605 & 1635, 0105 & 0135, plus Sun 0605 & 0635 on 17870 to ME (via Mike Barraclough)

BANGLADESH The Executive Committee of National Economic Council (ECNEC) approved 13 development projects including ''development and strengthening of old 100-kW shortwave transmitter at Savar under Information Ministry'' (*The New Nation* via Horacio Nigro, Uruguay)

BELGIUM [non] RVi at 1800-2000 to SWEu on 13790 in Dutch was registered both for Woofferton, UK at 180° and Sackville, Canada at 74°. At the outset of B-03, the latter was in use (via Wolfgang Büschel, Kai Ludwig)

BOLIVIA 5952.52, Radio Pio XII, Siglo XX, heard at 0000-0040, from a festival or popular party with different songs (Andean, romantic, "tecnocumbias", huaynos, etc). (Arnaldo Slaen, Argentina, *Cumbre DX*)

BULGARIA R. Bulgaria, B-03 English, daily, all 500 kW Plovdiv/Padarsko, with azimuths: WEu 0730-0800 11600 306, 13600 306; 1230-1300 11700 306, 15700 306; 1830-1900 & 2200-2300 5800 295, 7500 306; NAm 0000-0100 & 0300-0400 7400 295, 9400 306. Radio Varna program *"Hello Sea"/"Zdravei more"* in Bulgarian Sun 2200-0400 Mon on 9800 Varna 100 kW, non-directional. **http://www.nationalradio.bg** (*Observer*)

BURMA [non] Voice of Burma, via Almaty, Kazakhstan, 200 kW, 132°, M-F 1200-1300 on 9875 (Wolfgang Bueschel, DSWCI *DX Window*) as on page 518, WRTH 2003, separate from Democratic VOB (Bernd Trutenau, Lithuania, *ibid.*)

CANADA The CRTC renewed the license of CINW Montreal, along with its SW transmitter CFCX, until 31 August 2010 (via Artie Bigley, *DXLD*) Seems to me some actual operation of the CFCX SW transmitter on 6005, or at least a specific plan to reactivate it, should be required for license renewal! But this was just a co-pending auxiliary with the station which really matters, CINW. I would not be surprised if the CRTC were not even aware, or made aware, that the SW transmitter has been silent for several years (gh)

CBC's *Vinyl Café* on Saturday mornings is enjoyable, sort of the *Prairie Home Companion* of Canada, except better, including the Story Exchange, with host Stuart McLean reading/performing contributions from listeners. Via RCI Sat 1505-1600 on 9515, 13655, 17820. Show page: **http://www.cbc.ca/vinylcafe/** (Glenn Hauser, OK, *DX Listening Digest*)

CENTRAL AFRICAN REPUBLIC [non] R. Ndeke Luka, daily 1900-2000 was on 15545 via UK, moved to 11785 via UAE, 250 kW, 245° (Michael Bethge, Germany, WWDXC via *BC-DX*)

CHINA [and non] CRI's true B-03 schedule was slow to emerge, but the only direct frequency in English to NAm, 7405 was dropped and apparently replaced by 9755, heard well at 1300-1500, tho too close to VOA Philippines 9760 (gh) Also added Canadian relays: 9560 really two hours at 0400, \\ new 6190 (Bruce MacGibbon, OR) And testing relay via Sackville of the daily program *"Real Time China"* to North America, 5960 at 1130-1200 (John Figliozzi, Halfmoon, NY, *swprograms*)

[non] We happened to find Falun Gong at a new time on KWHR, 17510, 0200-0300 in Mandarin, not showing on WHR's own schedule, just 1500-1600 on 9930 as *'Dafa Hao'*. (Glenn Hauser, OK, *DX Listening Digest*)

COLOMBIA R. Melodía, 6140, reactivated, best signal from Colombia now, in the clear at 0600 with talk rather than music; blocked at 0100 by CRI DRM via Sackville (gh, OK) 1000 until fading at 1015, news and history (Roger Chambers, NY) Heard from 2343 until blocked by NHK Sackville 6145 at 0000 (Scott R Barbour Jr., NH, *DX Listening Digest*) 6139.78, 0941 with Javier Solís, 1000 news (Adán González, Venezuela, *DXLD*) Not clear why they bother to come and go on SW, since they have no interest in listeners abroad, and have rebuffed my attempts to contact them (Rafael Rodríguez, Bogotá, *Conexión Digital*)

La Voz del Guaviare spur heard with good but distorted signal on 10262v, clear ID at 0215, Voz de la Liberación program not \\ 6035 and 1180 (Björn Malm, Ecuador, *SW Bulletin*)

2580 and 1720 harmonics of 860, Voces de Occidente, Buga at 1115 UT (Björn Malm, Ecuador, *SW Bulletin*)

CONGO DR R. Kahuzi, 6210, regularly reaches Nairobi and most of Congo, all-fives. Would like to schedule an overnight DX test for the Americas; when would be best time of year for this? A person with the station asked Kim Elliott, who responded, dead of northern winter when conditions would be best for us. The details will be worked out and notified to Kim via E-mail. We very rarely see a DX report of this one from anywhere (Glenn Hauser, *DX Listening Digest*)

*All times UTC; All frequencies kHz; * before hr = sign on, * after hr = sign off; // = parallel programming; + = continuing but not monitored; 2 x freq = 2nd harmonic; B-03=winter season; [non] = Broadcast to or for the listed country, but not necessarily originating there; u.o.s. = unless otherwise stated*

CROATIA [and non] V. of Croatia heard with English news and magazine at 0700-0705 on 9470; 2315-2330 on 7285 via Germany (Alan Pennington, BDXC-UK) Probably repeats 2-hourly on 7285

CUBA At least one transmitter here has a persistent 'whistle' and deficient modulation: 17720 with CRI English at 1400-1600; also heard on CRI Spanish at 0000 on 5990, and sometimes RHC on 9820 (gh)

Did the Cuban techs spend the summer revamping MW transmitters? R. Rebelde harmonics on 2840, 3600, 4200, etc., no longer heard (Mark Mohrmann, VT, *DX Listening Digest*)

[non] Another Saturday morning favorite, in the hour before *Vinyl Café* from Canada [*q.v.*] is *Cubanola*, nostalgic pre-revolutionary music from scratchy old records, 1405-1500 on 7405, 11930, 13820, 15330 on R. Martí (gh) R. Martí B-03, continuous except for UT Mon 0400-1000:

0000-0300 6030 7365 11775 13820
0300-0400 6030 7365 7405 11775
0400-0700 6030 7405 9805 11775
0700-1000 5980 6030 7365 7405
1000-1200 5745 5980 6030 7365
1200-1300 5745 5980 7365 7405
1300-1400 5745 7405 11930 13820
1400-1500 7405 11930 13820 15330
1500-2000 11930 13820 15330 17670
2000-2200 9565 11930 13820 17670
2200-2400 6030 11930 13820 15330
(IBB via *World Of Radio*)

CZECH REPUBLIC R. Prague, English to NAm, B-03: 1400 21745; 2100 5930; 2230 7345 9435; 2330 5915 7345; 0100, 0200, 0400 6200 7345 (Andreas Volk, ADDX via Wolfgang Bueschel via Mike Barraclough, Letchworth, UK; also via Daniel Wylie via Dan Sampson, *DXLD*)

DENMARK [non] The Director of Radio Broadcasting at Danmarks Radio, Mr Leif Loensmann, seems to have asked the Ministry of Culture for permission to close down SW broadcasts of R. Denmark by the end of 2003 in order to save money. Danes living permanently abroad pay no annual fee to the station, and the number of Danes listening on business trips or holidays is too small to justify further SW broadcasts. Denmark will be amongst those few developed countries in the world who no longer serve listeners abroad via SW (Stig Hartvig Nielsen, Denmark, DSWCI *DX Window*) *Close down by the end of the year confirmed in Nov 6 decision, final broadcast probably Dec. 31 at 2230-2255* (Erik Køie, DR Radio, *DX Listening Digest*)

Here are the frequencies for North & South America, all from Sveiø, Norway site, with azimiuths, B-03: 1230 18950 280, 1330 17550 300, 1430 17735 300, 1530 17525 315, 1630 15705 315, 1730 18950 280, 1830 15735 300, 1930 13800 315, 2230 7560 235, 2330 7390 280, 2330 7405 235, 0030 7560 280, 0130 7560 280, 0130 9945 300, 0230 7560 280, 0230 9590 300, 0430 7465 315. Address: Radio Danmark, Radioavisen, Rosenorns Allé 22, DK-1999 Frederiksberg C, Denmark. Technical, reports: rdktek@dr.dk. WWW: **http://www.dr.dk/rdk** or **http://www.dr.dk/radiodanmark** Radio Denmark replies to complete reports by a QSL-card. Although not necessary, return postage is appreciated (1 IRC, 1 Euro or 1 US dollar). Recordings (including RealAudio and MP3 email files) are accepted. Tapes, however, are not returned (Erik Køie, DR Radio) *Norway is also quitting; see last month*

DOMINICAN REPUBLIC Cima Cien, 4959.86, was already before Hallowe'en calling itself *"Cima Sabor Navideño"* for Xmas season, with merengues, bachata 0336-0530+ (Adán González, Venezuela, *World Of Radio*) R. Cima has enjoyable music, all-night on weekends, best on UT Mondays, sometimes classical, pop or blues (Bob Montgomery, PA, *swprograms*)

ECUADOR 3380.07, C.R.I. Centro Radiofónico de Imbabura, Ibarra, Oct 16 at 0115 religious program to 0155* with ID "Super 12-30". Is on SW on sporadic occasions, maybe only 3-4 days a year (Björn Malm, Quito, Ecuador, *SW Bulletin*)

ERITREA/ETHIOPIA [nons] B-03 UNMEE in English/Amharic/Oromo, etc., via Dhabayya, UAE, 250 kW, 225°: 1030-1130 Tue 21550; 0900-1000 Sun 21460 (*Observer,* Bulgaria)

FRANCE Contrary to RFI's own current English schedule on website, best frequency for us at 1400 is 17620, not heard on listed 17515 which was best in A-03 (gh, OK)

GERMANY Only on Sunday, DW relays R. MultiKulti, Berlin in Romanes [Gypsy = Roma] language on 11905, 15275 at 1130-1200 (Paul Gager, Austria, BDXC-UK)

GREECE VOG English now heard 0930-1000 on 12105, 15630 and 1930-2000 on 12105 (Mike Barraclough, UK, World DX Club *Contact*) 0930 also on 9420 (ERA via Christos Rigas) English also on Sat at 1700 on 15630 direct, 17705 Delano (Jerry Lenamon, TX, *DX Listening Digest*) *Hellenes Around the World* (gh)

HONDURAS 4832.0, at 0125, R. Litoral, La Ceiba, religious and spiritual music, almost "native" or like a karaoke competition for the tone deaf. A couple of nice IDs (Hans Östnell, *SW Bulletin*)

INDIA Complete B-03 AIR home and external services by frequency: **http://www.geocities.com/bcdxnet/sw/** and at the official AIR web site. **http://allindiaradio.org/schedule/fqsch.html** (Jose Jacob, *dx_india*)

Akashvani ID of AIR heard after 6-pip timesignal at 0030 on 9292.0; I guess the 9425 Bangalore transmitter was wandering again (Glenn Hauser, OK, *DX Listening Digest*)

INDONESIA VOI asks for listener reports to P O Box 1157, Jakarta, but my letter was returned as unclaimed! They won't even bother to pick up their mail (Adán González, Catia La Mar, Venezuela, *DX Listening Digest*)

IRAN Tho VOIRI had registered the usual extensive SW schedule for B-03, only a few transmissions were actually on the air. It was hard to find anything in English, French, German or Spanish. IRIB had been hinting for some months that SW might be abandoned in favor of internet, asking obliquely for listener reaction. But what about the dozens of high-power SW transmitters which have been installed in the past few years? No doubt they could be piled on opposition frequencies for intensified jamming. Thanks to monitoring by Wolfgang Büschel, Kai Ludwig. The beginning of Ramadan coincided with B-03, so this may have affected the unexpected cutbacks, and/or a power struggle within the organization (gh)

In the near future we are planning to cut off shortwave frequencies and you can just listen to it via internet. So we kindly ask you to refer to IRIB web site **http://www.iribworld.com** and inform us your opinion as well as the quality of the voice received. We would also like to know your idea in general on removing shortwave (Circular e-mail from IRIB English Service via Wade Smith, NB, Don Rhodes, Victoria)

Original B-03 English schedule from IRIB; check if any of these still exist: 1030-1130 15385 15460 15480 21470 21730; 1530-1630 7115 7190 9610 11775 11835; 1930-2030 6110 7215 7320 11695 15140; 2130-2230 9780 11740; 0030-0230 6120 9580 (WWDXC via Wolfgang Büschel) 1930 audible on 6110, 7320 only (Mike Barraclough, UK)

The Voice of Justice, from Tehran, a new clandestine service? Heard on 15550 around 1100 (or was it 1200) with anti-American, anti-Zionist commentary (Robin L. Harwood, Tasmania, *DXLD*)

ISRAEL From 1 January 2004, the Overseas Network (Reshet Hey) will cease transmission. English, French and Persian services will be interlaced into the Hebrew (Reshet Bet) network. All other language services for Overseas will be discontinued (Moshe Oren, Bezeq)

English has been scheduled: 0500-0515 17600 11605 9435 6280; 1110-1120 17545 15640; 1800-1815 17545 11605; 2000-2030 15640 13720 11605 9435 6280. It was unclear whether any or all of these times and frequencies would need to be changed. The Reshet Bet frequencies are: 17535, 15760, 15640, 11590/11585, 9390, 9345, 7545 (gh)

LAOS [non] Hmong Radio, ULMD now on 15260 via Taiwan, 100 kW 250° at 0100-0200 Wed/Fri only (Michael Bethge, Germany, WWDXC)

LIBYA [non] LJB in Arabic B-03, presumably all via FRANCE:
1000-1100 21695, 1100-1230 17695 21485 21675, 1230-1400 21675 21695, 1400-1500 21675, 1600-1700 15220 15615, 1700-1800 15220 15615 15660 17880, 1800-1900 11635 11715 11860 15615, 1900-2030 11635 11715, 2030-2130 11635 (*Observer*, Bulgaria)

MALTA [non] V. of the Mediterranean B-03 in English: Mon-Sat 1730-1800 6185, Sat-Thu 2000-2100 7440, Sun 0900-1000 9630, via Rome or Moscow (via Alokesh Gupta, India, *DXLD*)

MÉXICO Whee! What fun, tracking the XERMX blobmitter around the 10 MHz area in the 1300-1500 period; for a week in October it ranged as high as 10035, to as low as 9950, a 15-kHz wide heavily distorted FM signal, often too close to the WEWN behemoth on 9955 after 1400. In mid-November around 1500 it landed on 10435-10475 (Glenn Hauser, OK, *DX Listening Digest*)

MONGOLIA Voice of Mongolia, English at 1500-1533 on 9720 with Mailbag on a Monday, ex-12015 (Martien Groot, Netherlands, DSWCI *DX Window*) Also 9720 at 2000, and 12015 ex-12085 at 1000 (Mark J. Fine, VA, *Cumbredx*)

NETHERLANDS RN's cutbacks from Oct. 26: Financial restrictions imposed on us by the Dutch government mean we have had to make difficult decisions. We opted to go for quality over quantity. We have had to cut SW transmission hours by 40% across the four languages. Although we have had to eliminate repeats of programmes, most of our existing production has been maintained. These budget cuts have nothing to do with the political complexion of the government, and everything to do with the dire state of the Dutch economy. Much of our funding now comes from general taxation, so we are competing for funding with schools, hospitals, etc. We do actually have lot of support in The Hague, and in the country, but we're facing difficult economic times. All the public broadcasters here in the Netherlands are shedding jobs and making hard choices (Andy Sennitt, RN, *digitalspy forums*)

The only remaining morning broadcast to NAm, via Canada 5965 at 1200-1300, fades out by 1230 when the feature starts (Will Martin, MO) Some RN English broadcasts to elsewhere which are also audible in NAm: 1000-1100 9785-B; 1400-1600 12080-M, 15595-M; 1900-2100 17810-B, 11655-M. This B-03 season, RN moved 9895 from Flevo to Madagascar for Spanish on three different beams to Latin America between 0000 and 0400. This site is well heard even in North America, far beyond its primary range (Glenn Hauser, *DX Listening Digest*) Latin America was taken into account in the original design. We have long distance antennas in Madagascar ranging from 7 to 17 MHz with bearings between 265-295°. These Spanish transmissions via Madagascar are only possible during our winter time. During summer is just not possible due to lack of propagation (Rocus de Joode, via Andy Sennitt, RN, *DX Listening Digest*)

RN broadcasts in all languages now start at the top of the hour instead of the bottom... to mesh better with other broadcasters in complex relay exchanges, increasing efficiency, very important in negotiating future budget requirements from the Dutch government (Andy Sennitt, RN, via John Figliozzi, *swprograms*) The Dutch Council for Cultural Affairs has called for a[nother] review of RN. The advisory body believes the Dutch service could consist entirely of programs made by domestic broadcasters and suggests that foreign languages should be limited to countries where the programs have a measurable impact (RN News Update 5 November via Tom McNiff, *DXLD*)

NEW ZEALAND RNZI' *Mailbox* was rescheduled during the sesquimonth it was off SW; still alternate weeks, Mons 0830, 1130, 1330, 1530, Tues 0330. Adrian Sainsbury announced this approximate 24h schedule: 1750 11980, 1850 15265, 2245 17675, 0400 15340, 0800 11675, 1100 15530, 1300 6095 (gh)

PAKISTAN R. Pak B-03 English: 0800-1104 Eu 17835 21465, usually includes English approximately 1100-1104 [and 0800-0804?]; 1600-1615 Af/ME 9320 11570 11640 15725 – but unheard on 9320 (PBC via Noel R. Green, UK, *BC-DX*)

PAPUA NEW GUINEA Wantok Light FM is planning to extend its reach to the rest of the country via the Short Wave band next year [2004] (Kevin Pamba, *The National* via Kim Elliott, Jilly Dybka, *DXLD*, and via Ulis R. Fleming, MD, *Cumbre DX*)

PERÚ R. Ancash, reactivated 4990.90 at 2345, but very low modulation.

R. Naylamp, Lambayeque has been on 4335v. I wonder if it really has a SW outlet or this is some kind of mixing product. Never heard Naylamp giving an ID for shortwave; also heard on MW drifting around 1575 (Bjorn Malm, Quito, Ecuador, SWB América Latina)

A new station on 6108.2 heard all day from 1400 to 0038 with folk music and Latin hits, no IDs or clues to location (Alfredo Benjamín Cañote, Spacemaster, Perú, *Conexión Digital*) 6108.4v, R. Internacional del Perú, QTH unknown, at 0030-0134* music and phone talk (Björn Malm, Quito, Ecuador, SWB América

Latina)

Mail from Antonio Campos, director of Radio Los Andes, 5030, says that they are reducing schedule since there are fewer SW radios nowadays, not much of a market compared to AM and FM, and there is also a local newspaper. Now it's 1100-1300, 1730-1930, 2300-0100 (Rafael Rodríguez, Colombia, *Conexión Digital*)

5906.3, Radio Melodía, 2230 music and ID "Radio Melodíaaaaaaaa", ex 5996.3 (Alfredo Cañote, Chaclacayo, Perú, *DX Listening Digest*)

Besides the above, and the Colombian, there is yet another R. Melodía, heard at 1100 and 2330-2355 on 2680.14, *"La frecuencia más popular"*, from somewhere in Peru [probably harmonic], seems to be in Provincia de Santiago de Chuco, Departamento de La Libertad (Björn Malm, Quito, Ecuador SWB América Latina)

Another new one is on 3204.99, at 1150, religious music from R. Mia (Björn Malm, Quito, Ecuador) Time check style and accent are Peruvian (Henrik Klemetz, Sweden, *DX Listening Digest*)

PHILIPPINES Radio Pilipinas B-03: 0200-0330 Filipino/English 12015 15120 15270; 1730-1930 English 11730 11890 15190 (IBB via BDXC-UK *Communication*)

POLAND R. Polonia announced on their Media Magazine October 28 that their agreement with TPSA for use of the SW site at Lesczynka was valid until the end of the calendar year. English is now at 1300-1400 on 9525 11820 and 1800-1900 on 5995 and new 7150 (Mike Barraclough, UK, *DX Listening Digest*) Not really audible in NAm (Roger Chambers, NY) And then what?

ROMANIA For B-03, RRI made some drastic cuts in its schedule: Arabic and Russian 50%, Italian 33%, Spanish 25%, English 21%, French 18%, but German increased 8%; this due to the pending installation of four new transmitters (via Jean-Michel Aubier, France)

RUSSIA A news item on VOR says they plan to have 100% digital transmission facilities within the next 5 Years. Their present air time procurement is taking 70% of their budget and they are seeking to reduce this substantially. I presume this refers to DRM (Ken Fletcher, BDXC-UK)

SEYCHELLES [non] FEBA Radio English B-03: 1400-1415 to Pakistan, Afghanistan, Iran on 9445-Novosibirsk; 1500-1600 to South India, Maldives, Sri Lanka on 7340-Irkutsk (via BDXC-UK *Communication*)

SIKKIM AIR Gangtok, 3390 at 0100-0400 and 1030-1600 mainly in Nepali, but also in Hindi, Lepcha, Limboo; Sikkimese daily 1200-1230; English Sat 1430; no longer on 6085 at 0700-0930 (Maarten Van Delft, visiting Sikkim, DSWCI *DX Window*)

SINGAPORE Instead of a variety of domestic programs relayed on SW 6150, from Nov 1, MediaCorp put NewsRadio 938 on there at 2300-1100 and 1400-1600, before and after the RSI external service at 1100-1400 (Tony Rogers, BDXC-UK *Communication*)

SLOVAKIA Altho RSI began B-03 with three frequencies on each transmission as usual, power was reduced from 250 to 200 kW Nov 1, and it was soon decided to turn off one of the transmitters Dec 1, for budgetary reasons (via Jean-Michel Aubier, France) Only English to us at 0100-0130 had been on 5930 NAm, 7230 CAm, 9440 SAm (via Bernie O'Shea, Canada, *DX Listening Digest*)

SOUTH AFRICA For B-03 Channel Africa in English expanded to 55 minutes: 0300 9770, 0500 11710, 0600 15215, 1500 17770, 1800 15265. Also a new continuous service in English and various other languages: 0300-0500 3345, 0500-1600 9525, 1900-2200 3345. Radio Sondergrense to the North Cape in Afrikaans: 0500-0700 7185, 0700-1700 9650, 1700-0500 3320 (SENTECH)

SPAIN REE's *"lenguas españolas"* other than Castilian have been reduced to one airing M-F, 1340-1355 Catalán, Galician, Basque, to Europe 15585, NAm 17595, SAm 21570. This is a symptom of REE merging various services into a single simultaneous stream, so the time is bound to be less convenient in some target areas than in others (from sked via Rubén Guillermo Margenet, *Conexión Digital*)

On Nov 9, REE launched a weekly program linking Spanish soldiers in Iraq with their families, *Aquí España*, a joint production with Radio 5 Todo Noticias, Sun 1405-1500 on 21610 to ME, probably also to other areas (Andy Sennitt, *Media Network* blog)

SUDAN [non] Merlin B-03 schedule includes Educational Development Council, via Wooferton to EAf, 0300-0500 9760, 1700-1800 15275, 1800-1900 12015 (via Andreas Volk, Germany, ADDX, via Wolfgang Büschel, via Mike Barraclough) That's really the Sudan Radio Service, produced by EDC in Washington, DC (Scott R. Barbour, Mike Barraclough) Expansion plans? Actually heard at 1500-1700 daily on 15530, Woofferton, or Skelton instead? (Wolfgang Büschel) Included English news at 1515 (Mike Barraclough, Letchworth, UK, *World Of Radio*) Also Arabic, Sudanese Arabic, Shona, Nuer, Dinka (*Observer*, Bulgaria)

TIBET Xizang PBS, Lhasa now opens at 2150 and closes at 1730 on 4905, 4920, 5240 and 7385 kHz. ID: "China Tibet People's Broadcasting Station". (Karel Honzik, Czechia, *hard-core-dx*)

China Tibet People's Broadcast Company, Lhasa heard in English at 0700-0730, 1100-1130 and 1630-1700 with *"Holy Tibet"*, a propaganda-style 'cultural' program to justify China's annexation of Tibet, on 3995, 4905, 4920, 6110, 6130, 6200, 7385, 9490, 9580. Though announced as Mon-Sat, it's also on Sunday. Comments and suggestions requested to: CTPBC, 41 Central Beijing Road, Lhasa 850000, Tibet Autonomous Region, China (This address differs from that given in the WRTH 2003). Also heard with American English language lessons at 1400-1430 on 3910, 4820, 5935, 6050, 7170, 7240 (Maarten Van Delft, visiting Sikkim and/or Bhutan, DSWCI *DX Window*)

[and non] V. of Tibet, 1430-1515 now using 12025. Chinese jammer got them from day one. Ex 17520/540. The Chinese have a very smart monitoring team now, unlike a few years back when a frequency change from IBB or VOT took them a week to find out. Now they just don't put jammers on and go to sleep. They monitor and if they don't find the broadcast within 5 minutes, they take the jammer off and go looking for the new frequency (G.V.A. Goonetilleke, Sri Lanka, *CRW*)

Other randomly used frequencies via Almaty, Dushanbe and Tashkent in previous years: 1215-1300 15400TAC 15615AA 15645DB 21495TAC 21525TAC 21635TAC 21760TAC; 1430-1520 11975TAC 12025AA/DB 12145TAC (Wolfgang Büschel, *BC-DX*)

TURKEY Not only Vietnam [*q.v.*], but VOT also started B-03 on 7100, protested by ham intruder watchers, and soon agreed to move to 9840 from Nov 10 (via Wolfgang Büschel) Unfortunately 9840 at 1800-2255 conflicts with R. Liberty until 1900, VOA until 2000 M-F, CRI until 2200 (*Observer*, Bulgaria)

UAE The Emirs apparently have no problem with gobs of Christian programming being broadcast from their station at Dyabbaya, now brokered by Merlin. In the B-03 season these are the clients: primarily AWR, plus Gospel for Asia, Herald of Truth, Bible Voice, TWR, WYFR, as well as secular stations RFI, BBC and NHK. UNMEE [see ERITREA] and IBB also use it (gh, analyzing a complete schedule via Andreas Volk, Wolfgang Büschel, Mike Barraclough)

UK Alistair Cooke is still doing his *Letters from America*, on the BBCWS, but you would be excused for thinking otherwise, since the winter scheduling lacks this on the Americas stream at any time SW is in use! Just Sat 0915, 1845, Mon 0932. If you can get the European stream, try Sat 0645, 2345, Sun 0432 (gh)

UNITED NATIONS [non] UN Radio's only English broadcast, M-F 1730-1745: 17810 Ascension, 15495 UK, 7170 South Africa (via Bill Westenhaver)

USA VOA *News Now* was reduced from 24 to 19 hours per day, dropping 0700-1200 UT [*Not Now*] from Oct 27. No longer available early evenings in EAs, eliminates morning broadcast to Ams, 1000-1100. The *News Now* webstream and 24-hour satellite channels during 0700-1200 insert *Music Mix*, still news on the hour, so a newscaster will be working overnight. That person will be busy when a crisis inevitably erupts. *Main Street*, now with only occasional brief appearances by me, airs UT Sat 2233, Sun 0033, 0433, 0633, 1233, 1633 (Kim Elliott, VOA)

The VOA, Muffled – The BBG no longer regards English as a "Priority One" language. How is this for enlightened government policy: For five crucial hours a day – during morning "drive time" in Eastern Europe and parts of Africa, late morning in the Middle East and early evening in East Asia – the straight news reporting of VOA is no longer available in English on short-wave, FM or the Internet, except for a six-minute newscast at the top of the hour. The cost savings will amount to about a million dollars a year (Sanford J. Ungar, former VOA director, *Washington Post* via Mike Cooper)

WWRB no longer allows promotion of web casting (non compete clause) over our station. This is hurting shortwave as a whole! Only a fool would allow someone to try and move his bread and butter audience to competing media. Getting on the Internet gobbles up 13 months' worth of the average family's disposable income! The result? No financial support for the programming, stations! The ONE time cost for a good shortwave radio? $100 dollars! (Dave Frantz, WWRB, by e-mail, *DX Listening Digest*) WWRB intrudes on the 160m hamband with a mix on 1805 (Tom, W8JI, *Topband* mailing list, via John Carver) 6890 minus 5085 (gh)

WRMI's second transmitter will be a modified Collins, 50 kW. No new antenna. We'll basically connect one transmitter to each of the existing antennas, so we can have two simultaneous, mostly separate services, to North and Latin America. We have several current clients that want more airtime now, but we don't have much more to sell (Jeff White, WRMI, *DX Listening Digest*)

KAIJ, 5755, heard at 0141 with the same kind of whistling problem as Cuba, *q.v.* (gh)

WINB abandoned 13570 and 12160 for the winter; B-03: 1100-1300 9320, 1300-2300 9930, 2300-0600 9320 (Hans Johnson, *Cumbredx*) Clashes with KWHR and all its Asian clandestine programs 1300-1700. *World Of Radio* UT Thu 0230 on 9320 (gh)

WHRI heard on 4920, semi-harmonic of 9840 at 1209-1230 when I was trying to hear Chennai, India (Jerry Lineback, KS, NASWA *Flashsheet*)

[non] AWR's B-03 frequency schedule is valid only until Dec. 31. This is because the AWR board voted large reductions in airtime for 2004 due to severe budget constraints. All languages will be affected by at least a 50% cut in airtime for 2004 (Roberto Scaglione, Sicily, *DX Listening Digest*)

URUGUAY 6045.18, Radio Sport, Montevideo, 1000-1015 with basketball, best on LSB (Arnaldo Slaen, Argentina, *Cumbre*)

Sinfonía FM, Santa Clara de Olimar, 6155.0, 1001-1035, poor with rapid talk, ads, ID (Takeshi Sejimo, Japan, *Radio Nuevo Mundo*) This is Banda Oriental, Sarandí del Yí, Departamento de Durazno, live sport coverage in network with other stations of "Gran Cadena de la Amistad", of which Sinfonía FM is one (Horacio Nigro, Uruguay, *DX Listening Digest*)

UZBEKISTAN R. Tashkent B-03 English: 0100-0130 7160, 5975, 6165; 1200-1230 and 1330-1400 9715, 5975, 6025, 5060; 2030-2100 and 2130-2200 11905, 7185, 5025 (via Craig Seager, *Australian DX News*)

VENEZUELA The harmonic on 3160 IDing as Radio Celestial 1580 AM, comes from the 15 kW religious station in San Francisco, Estado Zulia, formerly R. Occidental (José Elías Díaz Gómez, *Conexión Digital*)

VIETNAM VOV began the B-03 season on 7100 between 1600 and 2130; the DARC Monitoring System, ham intruder watch group in Germany quickly protested (via Wolfgang Büschel) A revised schedule soon showed 7280 instead for English at 1600, 1800, 1900, 2030 (via Alokesh Gupta, India)

[non] Degar Voice program in to Vietnam/Cambodia on 7180 at 1300-1330 Tue/Thu/Sat only via Chita, Russia, 250 kW, 194° (Michael Bethge, Germany, WWDXC)

WALES [non] Wales Radio International B-03 via England: Fri 2130-2200 7110 Eu; Sat 0300-0330 9735 NAm; Sat 1130-1200 17625 AuAs (Dan Sampson, *Prime Time Shortwave*)

WESTERN SAHARA [non] Radio of the SADR, 7460 very strong here at 0619-0654+, commentary interspersed between exceptionally interesting and beautiful vocal music with what sounds like loud and percussion accompaniment, both male and female voices (Steve Waldee, San José, CA, *DX Listening Digest*) 7460, R. Nacional de la República Árabe Saharaui Democrática, 2047- Arabic chants, string and percussion music. Fanfares and many mentions of Arabiya. Into Spanish program at 2300 after full ID in Arabic and Spanish (Robert Ross, Ont., Musselman Lake DX Camp, ODXA)

Until the Next, Best of DX and 73 de Glenn!

Gayle Van Horn
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0014 UTC 15120
CUBA: China Radio Intl relay. Spanish service with discussions. **Radio Havana Cuba** 9550, 3310-22220+. "Noticias Internacional" Spanish newscast. (Harold Frodge, Midland, MI)

0015 UTC on 4746.86
PERU: Radio Huanta 2000. Spanish. Radio novela program. Peruvians audible; **Radio La Hora** 4856.19, 2237; **Radio Sicuani** 4826.46; **La Voz de la Selva** 4824.42, 2316-2331; **Radio Atlantida** 4790.02, 2339-2345. (Nicholas Eramo, Buenos Aires, Argentina/HCDX) **Radio Andina** 4995, 0945. (Jill Dybka, Kingston Springs, TN)

0036 UTC on 6925 USB
PIRATE: Possum Hunting Radio. 6925 USB. Barely intelligible IDs and rock music. **WMFQ** 6925, 2338-0000+; **Radio FCC** 5925 USB, 0115-0118 with Little Richard tunes. **Partial India Radio** 6925, 0158-0207+.QSL via Providence. **Radio PSA** 6925 USB, 0416-0421*.**KIPM** 6925, 0053-0119* **Under Cover Radio** 6949.8 USB, 0333-0353+. **WSDW Shadow Radio** 6950 USB, 0100-0118+. **WJAM Punk SW** 6925, 2302-2320+.**WMPR** 6925, 2326-2334+; **Truck Driver Man** 6925 USB, 0209-0230+. **WHYP** 6925, 2302-2311+. (Frodge, MI)

0100 UTC on 9985
NORWAY: Radio Norway Int'l. Time pips to identification. Regional news to update on Iraq. (William McGuire, Cheverly, MD)

0110 UTC on 4965
ZAMBIA: Christian Vision Intl. Music countdown of pop/rock from Aussie accented female. Station audible 2205-2215 with religious testimonials and station identifications. Very good reception for reporting. (Frank Hillton, Charleston, SC) 4965, 2345. (Dybka, TN)

0205 UTC on 15575
SOUTH KOREA: Radio Korea Intl. Newscast plus item on North Korea's missle test. Weather, pop music and "RKI" identification at 0215, // 9560 via **Canada**. 15575, 2350-0000* (Stewart MacKenzie, Huntington Beach, CA)

0210 UTC on 11710
ARGENTINA: RAE. Mailing addresses at tune-in to station ID and address. Tango music program followed by national news and sports update. (Sam Wright, Biloxi, MS) 15345, 2327-2338, **Radio Nacional** IDs. (Scott, R. Barbour Jr, Interval, NH/HCDX)

0302 UTC 9660
FRENCH GUIANA: Radio Japan relay. Japanese text to 0312, // 17810 // 15195, // 15325; **Canada** relay 5960; **Sri Lanka** relays audible 17560, 15240. (MacKenzie, CA) **Radio Japan Gabon** relay 15355, 1736-1800+. (Frodge, MI)

0309 UTC on 9770
SOUTH AFRICA: Channel Africa. African news including correspondent from Burundi, followed by sports update. Fair signal quality. (Martin Gallas, Jacksonville, IL)

0315 UTC on 9640
CANADA: Deutsche Welle relay. Comments to DW identification at 0316, // 9735 via Germany. Canadian relay's observed as; **Voice of Vietnam** 6175, 0330; **China Radio Int'l** 9560, 0334; **RTE Ireland** 13640, 1845. (MacKenzie, CA) **Radio Canada Intl** 13650, 1601. (McGuire, MD)

0654 UTC on 9870
MONACO: TWR. *Family Bible Hour* to hymns and several IDs. (Jerry Ervine KC5YRE, Hidalgo, TX)

0830 UTC on 17780
AUSTRIA: AWR. German. Announcer's text to freqs and station address. ID as, "Voice of Hope" to Christian music. (Ervine, logged in Germany)

0909 UTC on 4919.96
INDONESIA: RRI-Biak (tentative). Indonesian music to interval signal and presumed local newscast. Subsequent Indo logs as; **RRI-Gorontalo** 3266, 1106; **RRI-Makassar** 4753.35, 1057; **RRI-Sorong** 4870.93, 1058; **RRI-Wamena** 4869.98, 1115. (Dybka, TN) **RRI-Pontianak** 3976, 1258-1320; **RRI-Ternate** 3344.85, 1322-1355; **RRI-Serui** 4606.42, 1338-1400*. (Kouji Hashimoto, Yamanashi, Japan/Japan Premiur, DXLD)

0920 UTC on 5045.31
BRAZIL: Radio Guaruja Paulista. Portuguese. Regional music program to station ID with musical jingle. SINPO 24322. (Slaen, ARG) Brazilian's audible; **Radio Nacional** 6180, 0505 **China Radio Int'l** via Brasilia, Brazil 9665, 0340 in Spanish. (MacKenzie, CA) **Radio Cultura** 3365, 2302-2305. **Radio Conghonas** 4775, 0022-0030. (Eramo, ARG) **Radio Educacao Rural** 4754.4, 0915; **Radio Clube** 6040, 0918; **Radio Rural** 4765, 0920; **Radio Rio Mar** 9695, 1025; **Emissora Rural** 4945, 2350-0105; **Radio Guaiba** 6000, 0945. (Dybka, TN)

1055 UTC on 9504.85
PERU: Radio Tacna. Local ads to Radio Tacna identification. Local time check and news. (Slaen, ARG)

1109 UTC on 15415
UKRAINE: Radio Ukraine Intl. Program about NATO, followed by *Ukraine Today*. (Ervine, Germany) 5905, 0341-0407 in Ukranian/English segments. Classical music, IDs with fair/poor audio to 0400. (Barbour,NH)

1126 UTC on 9625
BOLIVIA: Radio Fides. Spanish jingle and text to local time check. Bolivia's **Radio San Jose** 5580.4, 2253-2300. (Slaen, ARG) **Radio San Miguel** 4902.6, 0159-0205* (Hillton, SC)

1135 UTC on 3355
PAPUA NEW GUINEA: Radio Simbu. Male announcer's Pidgin text of news script with fair signal quality. Thanks to Oct. MT PNG feature logged PNG station as; **Radio Sandaun** 3205, 1120; **Radio East New Britain** 3235, 1125; **Radio Madang** 3260, 1140; **Radio Milne Bay** 3365, 1145; **Radio East Sepik** 3335, 1150-1205*. (Tom Banks, Dallas, TX) **NBC** 4890, 0955. (Dybka, TN)

1221 UTC on 9525
POLAND: Radio Polonia. *Business Weekly* with heavy interference. Lady's segment on Chopin. (Ervine, Germany)

1305 UTC on 6095
NEW ZEALAND: Radio NZ Intl. Closing items of newscast to identification. *Dateline Pacific* to item on Cook Islands tourism. Fair signal quality. (GVH, NC)

1606 UTC on 17865
AUSTRIA: Radio Austria Intl. German news to English, *Inside Central Europe* segment featuring discrimination against women in Europe. Item on Radio Slovenia to celebrate anniversary. Excellent signal via CBC Sackville. (Gallas, IL)

1648 UTC on 5240
TIBET: Tibet People BS. English programming to Chinese music. Program schedule and identification at 1658. SINPO 35343. (Dimitriy Puzanov, Kazakhstan, Cumbre/DXLD)

1654 UTC on 11709
NORTH KOREA. Voice of Korea. French commentary with SIO 2+44. Audible 15245, 2116-2122+. Mentions of "DPRK", best to monitor in LSB. Suddenly off the air at 0118, // 13760 poor. (Frodge, MI) Audible 15180, 0005 // 13760 // 11735. (MacKenzie, CA)

1915 UTC on 12060
MALTA: Voice of Mediterranean. Travelogue program on Sardinia, the second largest island in the Med. (Ervine, Germany)

2050 UTC on 15150
INDONESIA: Voice of. Regional island vocal music continuous to 2057. Female's station identification to news briefs at 2100. Musical bridge to freq quote, time check and goodbye greeting from Jakarta. (Ervine TX)

2130 UTC on 7210.27
BENIN: Radiodiffusion Nationale. French talk to variety of Afro and French pops. Phone talk to ID and sign-off announcements and national anthem. Fair to good signal. (Brian Alexander, Mechanicsburg, PA/DXLD) 7210, 2201-2232+. (Frodge, MI)

2135 UTC 7380
USA: (Biafra) Voice of. Tune in to English talk about Nigeria into vernacular talks. Numerous IDs and mentions of coming from Washington, DC. Fair signal with co-channel interference. (Alexander, PA/DXLD)

2327 UTC on 7125
GUINEA. RTV Guineenne. Vernacular and French service. Announcer's talk with news items, and music to station ID and sign-off anthem at 0000. (Banks, TX)

Thanks to our contributors – Have you sent in YOUR logs? Send to Gayle Van Horn, c/o Monitoring Times (or e-mail gaylevanhorn@monitoringtimes.com) ***Please note:*** *paper strips and cassette recordings will no longer be accepted. English broadcast unless otherwise noted.*

The QSL Report

Gayle Van Horn
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National Holiday QSLing

Here's an extra slant for QSLing. All countries have national holidays, but have you considered taking advantage of them? Listeners may find special programming or extended hours in honor of the special day, and can take advantage of this excellent opportunity for a QSL. Don't forget to mention the holiday in your report, and you may find a QSL Manager who appreciates your interest in his county. Check out these January holidays and let us know your results. If you have any upcoming holidays to include for future issues, please send them in.

- **Sudan Independence Day 1 January**
- **Burma Independence 4 January**
- **Northern Mariana Island Commonwealth Day 8 January**
- **Australia Day 26 January**
- **India Republic Day 26 January**

ALBANIA

Radio Tirana, 9540 kHz. Full data station card unsigned. Received in 54 days for an English report and two souvenir post cards. Station address: External Service, Rruga Ismail Qemali Nr. 11, Tirana, Albania. Website: **http://www.radiotirana.net.** (Cesar Perez Dioses, Chimbote, Peru)

AMATEUR RADIO

USS Kidd, (DD-661) W5KID. Louisiana Naval War Memorial. (Ship Museum Weekend) 20 meters SSB. Full data color card. Received in 27 days for a self-addressed-envelope. QSL address: USS Kidd Amateur Radio Club c/o USS Kidd, 305 South River Road, Baton Rouge, LA 70802-6220. (Larry Van Horn NC)

USS Salem (CA-139) K1USN. Radio Club-"Pride of the 6th Fleet," (Ship Museum Weekend) 20/17 meters SSB. Full data black & white picture cards. Received in 30 days for self-addressed-envelope. QSL address: 739 Washington Street, Quincy, MA 02169. (Van Horn, NC)

USS Wisconsin (BB-64) N4WIS, Nauticus National Maritime Center, Norfolk, VA, 30 meters SSB (Ship Museum Weekend).Full data folder color card. Received in 27 days for a self-addressed-envelope. Verification via QSL Manager, USS Wisconsin RC, N4WIS, R. Brown, 4821 Rosecroft St., Virginia Beach, VA 23464. (Van Horn, NC)

GERMANY

Radio Africa International, 15715 kHz. Full data African map card signed by Raphael Mbadinga, Associate Producer, plus sticker and pamphlet. Received in 30 days for an English report and one U.S. dollar. Station address: 475 Riverside Dr., New York, NY 10115. (Bill Wilkins, Springfield, MO)

GREECE/ MOROCCO

Radio Sawa - Greece, 12040 kHz, and Morocco 12010 kHz. Full data verification for both sites, verified via email in one hour. Report sent via station website link at; **http://www.radiosawa.com.** I printed the verification on certificate paper (acid free) using a colored text and Times Roman font. (See *QSL Report*, Dec. 2003 for tips on electronic QSLing - Gayle VH, NC)

HUNGARY

Radio Budapest, 9590 kHz. Full data unsigned card showing historical photo of Magyar Radio. Received in 42 days for an email report to *english@kaf.radio.hu*. Station address: Brody Sandor utca 5-7, H-1800 Budapest, Hungary. Kraig Krist, Annandale, VA)

IRAN

Voice of Islamic Republic of Iran, 9590, 11670, 11750, 11920 kHz. Full date card of Khaju Bridge in large brown envelope with flag decal, packet on Kish Amusement Center, Iranian tourist map and Al-Tawhid booklet. Received for an English report. Station address: IRIB External Services, P.O. Box 19395-6767, Terehan, Iran. (Edward Kusalik, Alberta, Canada/Cumbre DX)

JAPAN

Radio Tampa, 9595 kHz. Special full data QSL card for Radio Tampa's last transmission day. Received in 11 days for an English report. Station address: Nikon Shortwave Broadcasting Co., Ltd. 9-15 Akasaka 1-chome, Minato-ku, Tokyo 107-8370, Japan. (Slaen, ARG)

MEDIUM WAVE

KSOP, 1370 kHz AM. My reception returned as "Confirmed," signed by Greg, plus three station stickers. Received for an AM report. Station address: P.O. Box 25548, Salt Lake City, UT 84125. (Patrick Griffith, Westminster, CO)

KTRS, 550 kHz AM. Full data verification letter signed by Judy Reishman-Admin. Asst. Received in seven days for an AM report and one US dollar. Station address: 638 W. Port Plaza, St. Louis, MO 63146. (Griffith, CO)

KTTH, 770 kHz AM. Full data form letter signed by John W. Price-Asst. Of VP Engineering. Received in six days for an AM report. Station address: Entercom, 1820 Eastlake Ave. East, Seattle, WA 98102-3711. (Patrick Martin, Seaside, OR)

WTTI, 1530 kHz AM. Partial data verification on station letterhead signed by C.W. Queen, Station Manager, plus business card. Received in 203 days for an AM report, one US dollar and address label (used for reply). Station address: P.O. Box 216, Dalton, GA 30722-0216. (Wilkins, MO)

MOROCCO

Voice of America relay, 15445 kHz. Full data photo card of Sao Tome transmitter site, unsigned, plus pocket color world atlas. Received in 36 days for an English report and souvenir post card. Station address: 330 Independence Avenue, SW, Washington, DC 20237. (Brian Bagwell, St. Louis, MO)

PIRATE

Sunshine Radio, 6950 kHz USB. Full data yellow paper QSL card unsigned. Received in 12 days for a pirate report via email to *grasscutterradio@yahoo.com* (Wilkins, MO) 6925 kHz USB/AM, email reply for two reports. Reply from ASunshine.@ Noted power as 90 watts USB and 15 watts AM. (Joe Wood, Gray, TN)

Grasscutter Radio, 6925 kHz USB/ AM. Email reply for two reports. Reply from "Grasscutter." Noted power as 90 watts USB, 25 watts AM. *grassscuttersradio@yahoo.com*. (Wilkins, MO)

ROMANIA

Radio Romania International, 11940 kHz. Full data *The Village Museum Peasant House* card, unsigned. Received in 32 days for an email report to *engl@rri.ro* Station address: 60-62 Berthelot St., RO-70747 Bucharest, Romania. (Krist, VA)

SYRIA

Radio Damascus, 13610 kHz. Full data station card signed by Director (unnamed). Received in 63 days for an English report, two dollars and self-addressed-envelope (not used for reply). Station address: Syrian Radio & Television, P.O. Box 4702, Damascus, Syria. Website: **http:// www.rtv.gov.sy** (Sam Wright, Biloxi, MS)

USA

Armed Forces Radio 12689.5 kHz via Key West. Full date verification on station letterhead signed by Brooke Armato, JO3 (SW), Broadcast Operations Specialist. Received in 45 days for an English report. Earlier reports via email had gone unanswered. QSL address: Naval Media Center, Mobile Detachment TWO, 2713 Mitscher Road SW, Naval District Anacostia Annex, Washington, DC 20373-5819. (Bagwell, MO)

WEWN, 7520 kHz. Full data unsigned color *10th Anniversary* card, plus separate mailing of brochures and schedule received. Received in 43 days for an English report, mint stamp and souvenir post card. Station address: 5817 Old Leeds Rd., Irondale, AL 35210. (Banks, TX).

John Figliozzi
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Streams of Consciousness

With all the talk last month about streams (in this column and in a review of Sirius Satellite Radio also authored by the oversigned), my mind appears to have sprung a few of its own!

❖ Language Lessons

What is it with foreign language lessons on shortwave? There have been a score or more of these on the air over the years. ***Starting Finnish*** (Radio Finland), ***A Language Without Bounds*** (Radio Exterior de Espana), ***Auf Deutsch Gesagt*** (Deutsche Welle), ***Let's Learn Chinese*** (Radio Taiwan International), ***Let's Learn Japanese*** (Radio Japan), ***Dutch by Radio*** (Radio Nederland), ***Russian by Radio*** (Voice of Russia/Radio Moscow) are just some of the program titles. Some have even offered printed texts to accompany the programs. But has anyone actually ever learned how to usefully speak a new language this way?

In fairness, some listeners have given personal accounts of how they learned English through a combination of the BBC's ***English by Radio*** and the VOA's ***Special English*** broadcasts and regular, attentive listening to their news and everyday programs. But I have to believe that these are rare occurrences owing more to intense personal commitment rather than the innate genius of this particular program genre.

The intent is certainly admirable. However, it appears (at least to this observer) that the effort is almost fatally flawed from the start. The medium itself can be a tremendous obstacle when reception is degraded. And are one or two five or ten minute programs a week really enough to teach anything significant?

If anything, any such effort needs to pay attention to those anecdotal accounts mentioned earlier. They ought to focus on making it possible for the listener to gain an increasing amount of information and enjoyment from the broadcaster's home language service. This approach would be infinitely more practical than teaching one how to ask for directions to the rest room. Beginners could be given a daily newscast at slower speaking speed. Advanced learners could move on to the regular service.

Makes sense to me anyway.

❖ SoNo

Gaby Katz hosts perhaps the best contemporary rock music/youth culture program on the airwaves today. But ***Sounds Nordic*** is only the most recent in a remarkable string of such programs from Radio Sweden. As a teen in the '60s, I was a regular listener to Roger Wallis' programs ***The Pops*** and then ***The Saturday Show*** which offered a brand of Euro-rock/pop unknown to most of my peers preoccupied with the "British invasion."

Whether you consider yourself young or old(er), this is an easygoing and enjoyable Sunday half hour that includes appealing music, pleasant and conversational interviews with contemporary Swedish musicians and introspective discussion of issues and concerns important to young people in Sweden, the Nordic region and Europe.

SoNo airs every Sunday except the first Sunday of the month. That day is given over to the equally interesting ***In Touch with Stockholm***, Radio Sweden's interactive listener contact program.

❖ What's Unique, Really?

For one thing, there's ***The Comfort Zone***, an ABC Radio National program relayed to international audiences by Radio Australia. How many programs seek to provide us with "a greater appreciation of the social, political and historical context of how food, gardens, landscape, architecture and design contribute to the way we live out our lives"? Or reflect "on the designs and rituals that govern our lives"?

That's right; this is the only one. And if you find yourself just a bit skeptical about the whole thing, let me assure you: it's a fascinating listen with fresh perspectives every week.

Recent shows covered topics like: why kids won't eat their crusts; why we wear what we wear; a cultural history of the apple; how much influence designers really wield over our home furnishings; the raw food movement; a cook who prepares and eats unusual foods, including roadkill; how youngsters relate to the architecture of public buildings like schools and museums.

Somehow, ***The Comfort Zone*** takes topics that at first glance seem way out there and tie them into how we almost unconsciously live our everyday lives. Like me, you'll hear yourself saying, "I never looked at it quite this way before."

❖ Religion for Adults

Speaking of unique, can you think of one program on domestic North American radio that offers intelligent, dispassionate discussion about religion and spirituality? I can't. The media here can't seem to fathom that religions and societies have important influences on one another and that sober discourse on these matters is possible, let alone worthy. Here, religious programming seems to be reserved only for prosyletizing, almost as if it were just another commodity marketing its wares.

Fortunately, international radio offers several programs with a more reasoned, "adult" approach to this topic. The BBC World Service has ***In Praise of God***, which gives insight into various faith practices and devotional exercises, and ***Reporting Religion***, which examines religious influences in major news events and analyzes religious and ethical issues. ***Heart and Soul*** uses a documentary format to look at how beliefs, values, and religion shape lives.

Radio Australia is fortunate to have Rachael Kohn. Her long-running ***The Spirit of Things*** explores contemporary values and beliefs through ritual, art, music, and sacred texts. The brief for this program is wide, ranging from traditional faiths to new age and other unconventional approaches. Her more recently developed program, ***The Ark***, uses religious history to examine and challenge long held perceptions. ***Encounter*** is a series seeking the connections between religion and life all over the world. ***The Religion Report*** analyzes events shaping the world of religion and how religion, in turn, is shaping the modern world.

RNZI broadcasts ***Spiritual Outlook***, which deals with spiritual and religious issues in many different faith traditions. When "Outlook" is not broadcast, there is usually a documentary series devoted to the same subject area. Even the Voice of Russia has ***The Christian Message from Moscow***, focusing on the Russian Orthodox faith and its cultural aspects.

Times and frequencies for the current programs discussed in this month's column are in *MT's Shortwave Guide*.

Happy New Year and, until next month, good listening!

How to Use the Shortwave Guide

0000-0100 twhfa USA, Voice of America 5995am 6130ca 7405am 9455af

① ② ⑤ ③ ④ ⑥ ⑦

Convert your time to UTC.

Broadcast time on ① and time off ② are expressed in Coordinated Universal Time (UTC) – the time at the 0 meridian near Greenwich, England. To translate your local time into UTC, first convert your local time to 24-hour format, then add (during Standard Time) 5, 6, 7 or 8 hours for Eastern, Central, Mountain or Pacific Times, respectively. Eastern, Central, and Pacific Times are already converted to UTC for you at the top of each hour.

Note that all *dates*, as well as times, are in UTC; for example, a show which might air at 0030 UTC *Sunday* will be heard on *Saturday* evening in America (in other words, 7:30 pm Eastern, 6:30 pm Central, etc.).

Find the station you want to hear.

Look at the page which corresponds to the time you will be listening. On the top half of the page English broadcasts are listed by UTC time on ① , then alphabetically by country ③, followed by the station name ④. (If the station name is the same as the country, we don't repeat it, e.g., "Vanuatu, Radio" [Vanuatu].)

If a broadcast is not *daily*, the days of broadcast ⑤ will appear in the column following the time of broadcast, using the following codes:

Day Codes

s/S	Sunday
m/M	Monday
t/T	Tuesday
w/W	Wednesday
h/H	Thursday
f/F	Friday
a/A	Saturday
D	Daily
mon/MON	monthly
occ:	occasional
DRM:	Digital Radio Mondiale

In the same column ⑤, irregular broadcasts are indicated "tent" and programming which includes languages besides English are coded "vl" (various languages).

Choose the most promising frequencies for the time, location and conditions.

The frequencies ⑥ follow to the right of the station listing; all frequencies are listed in kilohertz (kHz). Not all listed stations will be heard from your location and virtually none of them will be heard all the time on all frequencies.

Shortwave broadcast stations change some of their frequencies at least twice a year, in April and October, to adapt to seasonal conditions. But they can also change in response to short-term conditions, interference, equipment problems, etc. Our frequency manager coordinates published station schedules with confirmations and reports from her monitoring team and *MT* readers to make the Shortwave Guide up-to-date as of one week before print deadline.

To help you find the most promising signal for your location, immediately following each frequency we've included information on the target area ⑦ of the broadcast. Signals beamed toward your area will generally be easier to hear than those beamed elsewhere, even though the latter will often still be audible.

Target Areas

af:	Africa
al:	alternate frequency (occasional use only)
am:	The Americas
as:	Asia
au:	Australia
ca:	Central America
do:	domestic broadcast
eu:	Europe
irr:	irregular (Costa Rica RFPI)
me:	Middle East
na:	North America
om:	omnidirectional
pa:	Pacific
sa:	South America
va:	various

Choose a program or station you want to hear.

Selected programs for prime listening hours appear following the frequencies – space does not permit 24 hour listings nor can every station be listed. However, listings for the most popular stations and selected lesser-known stations illustrate the variety available on shortwave. The format of the listings alternates among three different styles – by station, by genre and by day – month by month. Times listed are approximate and programs are subject to change.

The program listings emphasize broadcasts targeted to North America. In most cases, the stations and programs listed should be readily receivable in North America using a portable radio. Most broadcasters produce one broadcast in English per day that is repeated over a 24 hour period to all areas. If you are able to listen to transmissions to other areas of the world during "non-prime time" hours, referring to the prime time listings for those stations will likely be helpful in determining what programs will be broadcast.

Occasionally, a program or station listing may be followed by a reference to another listing for the same program or station at a different time. This is done to conserve space and make it possible to provide more listings.

MT Monitoring Team

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Program Highlights

John Figliozzi

"Feedback" Gone

Radio Australia has cancelled the run of Roger Broadbent's weekly program "Feedback," which discussed aspects of RA's operations, as well as developments in international broadcasting and telecommunications matters. The program, though popular with many listeners, apparently was most popular with the "wrong" ones – specifically, listeners outside RA's primary target regions of Asia and the Pacific. It appears that management feels the resources used to produce this program can be put to better use producing programs of greater relevance and interest to those in Asia and the Pacific. The final program in this well-produced series aired on the weekend November 21-22. It will be missed.

Elliott Also Clipped

As first reported by *MT*'s Glenn Hauser, the **VOA** also has further limited Kim Elliott's appearances on its Sunday "Main Street" program. Many listeners will recall that Elliott produced and presented "Communications World," a popular magazine that chronicled developments in international communications including shortwave. It had a long run on the **VOA** that began in the 1980s with host Gene Reich (who is now with Worldspace) and ended in 2002. After a few months, Elliott popped up on "Main Street" as a weekly contributor with a three to five minute non-technical report discussing telecommunications developments. Now, according to Hauser's report, Elliott "may" appear on Main Street only occasionally.

RN Weekend Afternoons

Space does not permit their inclusion in this month's Shortwave Guide, but be reminded of Radio Netherlands' weekend afternoon broadcasts to North America between 1900 and 2100 UTC on 15315, 17725 and 17875 kHz. Here's the lineup for Sat.: 1900 *Vox Humana*; 1930 *News*; 1936 *Europe Unzipped*; 1955 *Insight*; 2000 *Amsterdam Forum*; 2030 *News*; 2036 *Europe Unzipped*. For Sun.: 1900 *Documentary*; 1930 *News*; 1936 *Wide Angle*; 1955 *Week Ahead*; 2000 *Vox Humana*; 2030 *News*; 2036 *Wide Angle*. Descriptions for these programs are contained within the SWG listings within RN's 0000, 0100, 0400 and 1200 transmissions.

0000 UTC - 7PM EST / 6PM CST / 4PM PST

0000	0007		Sierra Leone, SLBS	3316do		
0000	0015	vl	Cambodia, National Radio Of	11940as		
0000	0015		Japan, Radio	13650as	17810as	
0000	0030		Egypt, Radio Cairo	11725na		
0000	0030		Thailand, Radio	9680af		
0000	0030		UK, BBC World Service	3915as	11945as	
			17615as			
0000	0030		USA, Voice of America	7215va	9890va	11760va
			15185va 15290va	17740va	17820va	
0000	0045		India, All India Radio	9705as	9950as	11620as
			11645as 13605as			
0000	0055		Netherlands, Radio	9845na		
0000	0057		Canada, Radio Canada Intl	5960na	9590na	
			9755as 11895as			
0000	0100		Anguilla, Caribbean Beacon	6090am		
0000	0100		Australia, ABC NT Alice Springs	2310irr	4835do	
0000	0100		Australia, ABC NT Katherine	5025do		
0000	0100		Australia, ABC NT Tennant Creek	4910do		
0000	0100		Australia, Radio	9660pa	12080va	15240pa
			15415as 17580pa	17750as	17775va	17795va
			21725as			
0000	0100		Bulgaria, Radio	7400na	9400na	
0000	0100		Canada, CBC Northern Service	9625do		
0000	0100		Canada, CFRX Toronto ON	6070do		
0000	0100		Canada, CFVP Calgary AB	6030do		
0000	0100		Canada, CKZN St John's NF	6160do		
0000	0100		Canada, CKZU Vancouver BC	6160do		
0000	0100		Costa Rica, University Network	5030am	6150am	
			7375am 9725sa	11870am	13750na	
0000	0100	1st a	Finland, Scandinavian Weekend Radio		5990eu	
			11690eu			
0000	0100		Germany, Deutsche Welle	7290as	9880as	
0000	0100		Guyana, Voice of	3291do	5950do	
0000	0100		Japan, Radio	6145na		
0000	0100		Malaysia, RTM Radio 4	7295do		
0000	0100		Namibia, Namibian BC Corp	3270af	3290af	
			6060af			
0000	0100		New Zealand, Radio NZ Intl	17675pa		
0000	0100		Sierra Leone, Radio UNAMSIL	6139af		
0000	0100		Singapore, Mediacorp Radio	6150do		
0000	0100	vl	Solomon Islands, SIBC	5020do	9545do	
0000	0100		Spain, Radio Exterior Espana	6055am		
0000	0100		UK, BBC World Service	5970as	5975ca	
			6195as 9410as	9740as	9825sa	11955as
			12095as 15280as	15310as	15360as	17790as
0000	0100		USA, Armed Forces Radio	4319usb	5446usb	
			5765usb 6350usb	7507usb	10320usb	12133usb
			12579usb	13362usb	13855usb	
0000	0100		USA, KAIJ Dallas TX	13815va		
0000	0100		USA, KTBN Salt Lake City UT	7505na		
0000	0100		USA, KWHR Naalehu HI	17510as		
0000	0100	twhfa	USA, Voice of America	5995am	6130am	7405am
			9455am 9775am	11695am	13790am	
0000	0100		USA, WBCQ Kennebunk ME	7415na	9330na	
0000	0100	mtwhfa	USA, WBCQ Kennebunk ME	5105na		
0000	0100		USA, WBOH Newport NC	5920am		
0000	0100		USA, WEWN Birmingham AL	5825va		
0000	0100		USA, WHRA Greenbush ME	7580va		
0000	0100		USA, WHRI Noblesville IN	5745va	7315am	
0000	0100		USA, WINB Red Lion PA	9320am		
0000	0100		USA, WJIE Louisville KY	13595am		
0000	0100	sm	USA, WRMI Miami FL	9955am		
0000	0100	twhfa	USA, WRMI Miami FL	7385na		
0000	0100	mwfas	USA, WSHB Cypress Creek SC	7535am		
0000	0100	mwf	USA, WSHB Cypress Creek SC	9430am		
0000	0100		USA, WTJC Newport NC	9370na		
0000	0100	sm	USA, WWBS Macon GA	11900na		
0000	0100		USA, WWCR Nashville TN	3210na	5070na	
			7465na 13845na			
0000	0100		USA, WWRB Manchester TN	5050na	5085na	
			6890na			
0000	0100		USA, WYFR Okeechobee FL	6085na	9505na	
			11720sa			
0000	0100	vl	Vanuatu, Radio	3945al	7260do	
0000	0100		Zambia, Christian Voice	4965do		
0015	0030	twhfa	Austria, Radio Austria Intl	13730sa		
0030	0100	mtwhf	Germany, Bible Voice Broadcasting	7210as		
0030	0100		Iran, Voice of the Islamic Rep	6120am	9580am	
0030	0100		Lithuania, Radio Vilnius	6120al	7325na	
0030	0100		Sri Lanka, SLBC	6005as	9770as	15745as
0030	0100		Thailand, Radio	13695na		
0030	0100		UK, BBC World Service	9580as		
0045	0100	twhfa	Austria, Radio Austria Intl	13730sa		
0055	0100		Italy, RAI Intl	9675na	11800na	

0100 UTC - 8PM EST/ 7PM CST / 5PM PST

0100	0115		Italy, RAI Intl	9675na	11800na	
0100	0120		Kyrghyz, Kyrghyz Radio	4010as	4795as	
0100	0127		Czech Rep, Radio Prague Intl	6200na	7345na	
0100	0127		Slovakia, Radio Slovakia Intl	5930na	7230ca	
			9440sa			
0100	0127		Vietnam, Voice of	6175na		
0100	0130	s	Germany, Universal Life	9435as		
0100	0130	mtwhfa	Serbia & Montenegro, Intl Radio	7115na		
0100	0130	twhfa	USA, Voice of America	5995am	6130am	7405am
			9455am 9775am	13790am		
0100	0130		Uzbekistan, Radio Tashkent Intl	5975as	6165as	
			7160as			
0100	0155		Netherlands, Radio	6165na		
0100	0156		China, China Radio Intl	6140va	9580na	
			9790na			
0100	0156		North Korea, Voice of	3560as	6195as	7140am
			9345as 11735am			
0100	0156		Romania, Radio Romania Intl	6040na	9510na	
			9530na 11740na			
0100	0200		Anguilla, Caribbean Beacon	6090am		
0100	0200		Australia, ABC NT Katherine	5025do		
0100	0200		Australia, ABC NT Tennant Creek	4910do		
0100	0200		Australia, HCJB	15555pa		
0100	0200		Australia, Radio	9660pa	12080va	15240pa
			15415as 17580pa	17750as	17775va	17795va
			21725as			
0100	0200		Canada, CBC Northern Service	9625do		
0100	0200		Canada, CFRX Toronto ON	6070do		
0100	0200		Canada, CFVP Calgary AB	6030do		
0100	0200		Canada, CKZN St John's NF	6160do		
0100	0200		Canada, CKZU Vancouver BC	6160do		
0100	0200		Costa Rica, University Network	5030am	6150am	
			7375am 9725sa	11870am	13750na	
0100	0200		Cuba, Radio Havana	6000na	9820na	
0100	0200	1st a	Finland, Scandinavian Weekend Radio		5990eu	
			11690eu			
0100	0200		Guyana, Voice of	3291do	5950do	
0100	0200		Japan, Radio	11860as	11880va	15325as
			17560va 17685pa	17810as	17835as	17845as
0100	0200		Malaysia, RTM Radio 4	7295do		
0100	0200		Namibia, Namibian BC Corp	3270af	3290af	
			6060af			
0100	0200		New Zealand, Radio NZ Intl	17675pa		
0100	0200		Sierra Leone, Radio UNAMSIL	6139af		
0100	0200		Singapore, Mediacorp Radio	6150do		
0100	0200	vl	Solomon Islands, SIBC	5020do	9545do	
0100	0200		Sri Lanka, SLBC	6005as	9770as	15745as
0100	0200		UK, BBC World Service	5975ca	6195as	
			9410as 9525ca	9825sa	11955as	12095sa
			15280as 15310as	15360as	17790as	
0100	0200		Ukraine, Radio Ukraine Intl	5905na		
0100	0200		USA, Armed Forces Radio	4319usb	5446usb	
			5765usb 6350usb	7507usb	10320usb	12133usb
			12579usb	13362usb	13855usb	
0100	0200		USA, KAIJ Dallas TX	13815va		
0100	0200		USA, KTBN Salt Lake City UT	7505na		
0100	0200		USA, KWHR Naalehu HI	17510as		
0100	0200		USA, Voice of America	7200va	7255va	9850va
			11705va 11820va	15250va	15290va	17740va
			17820va			
0100	0200		USA, WBCQ Kennebunk ME	5105na	7415na	
			9330na			
0100	0200		USA, WBOH Newport NC	5920am		
0100	0200		USA, WEWN Birmingham AL	5825va		
0100	0200		USA, WHRA Greenbush ME	7580va		
0100	0200		USA, WHRI Noblesville IN	5745va	7315am	
0100	0200		USA, WINB Red Lion PA	9320am		
0100	0200		USA, WJIE Louisville KY	13595am		
0100	0200	sm	USA, WRMI Miami FL	9955am		
0100	0200	twhfa	USA, WRMI Miami FL	7385na		
0100	0200		USA, WSHB Cypress Creek SC	7535na		
0100	0200	m	USA, WSHB Cypress Creek SC	9430am		
0100	0200		USA, WTJC Newport NC	9370na		
0100	0200	sm	USA, WWBS Macon GA	11900na		
0100	0200		USA, WWCR Nashville TN	3210na	5070na	
			5935na 7465na			
0100	0200		USA, WWRB Manchester TN	5050na	5085na	
			6890na			
0100	0200		USA, WYFR Okeechobee FL	6065na	9505na	
			15060as			
0100	0200	vl	Vanuatu, Radio	3945al	7260do	
0100	0200		Zambia, Christian Voice	4965do		
0105	0115	sm	Austria, Radio Austria Intl	7325am	9870am	
0115	0130		Austria, Radio Austria Intl	7325am	9870am	
0130	0200		Sweden, Radio	9435va		
0130	0200		UK, RTE Radio	6155ca		
0130	0200	twhfa	USA, Voice of America	5995am	6130am	9455va
			13740am			
0135	0145	sm	Austria, Radio Austria Intl	7325am	9870am	
0140	0200		Vatican City, Vatican Radio	7335as	9865as	
0145	0200		Austria, Radio Austria Intl	7325am	9870am	

SELECTED PROGRAMMING BEGINS ON PAGE 55

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0200 UTC - 9PM EST / 8PM CST / 6PM PST

0200	0227		Czech Rep, Radio Prague Intl	6200na	7345na
0200	0228		Hungary, Radio Budapest	9835na	
0200	0230		Serbia & Montenegro, Intl Radio	7130na	
0200	0230		USA, KJES Vado NM 7555na		
0200	0256		North Korea, Voice of 4405as	9325as	11335as
0200	0256		South Korea, Radio Korea Intl 15575na	9560na	11810sa
0200	0259		Canada, Radio Canada Intl 11725am 15150as 17860am	6040am	9755am
0200	0300		Anguilla, Caribbean Beacon	6090am	
0200	0300	twhfa	Argentina, RAE 11710am		
0200	0300		Australia, ABC NT Alice Springs	2310irr	4835do
0200	0300		Australia, ABC NT Katherine	5025do	
0200	0300		Australia, ABC NT Tennant Creek	4910do	
0200	0300		Australia, HCJB 15555pa		
0200	0300		Australia, Radio 9660pa 15415as 15515va 17580pa	12080va 17750as	15240pa 21725as
0200	0300		Austria, AWR Europe 7230as		
0200	0300		Canada, CBC Northern Service	9625do	
0200	0300		Canada, CFRX Toronto ON	6070do	
0200	0300		Canada, CFVP Calgary AB	6030do	
0200	0300		Canada, CKZN St John's NF	6160do	
0200	0300		Canada, CKZU Vancouver BC	6160do	
0200	0300		Costa Rica, University Network 7375am 9725sa 11870am 13750na	5030am	6150am
0200	0300		Cuba, Radio Havana 6000na	9820na	
0200	0300		Egypt, Radio Cairo 11780na		
0200	0300	1st a	Finland, Scandinavian Weekend Radio 11720eu		5980eu
0200	0300	as	Germany, Bible Voice Broadcasting	17540as	
0200	0300		Guyana, Voice of 3291do	5950do	
0200	0300		Indonesia, Voice of 9525as	11785as	
0200	0300		Malaysia, RTM Radio 4	7295do	
0200	0300		Myanmar, Radio 7185do		
0200	0300		Namibia, Namibian BC Corp 6090af	3270af	3290af
0200	0300		New Zealand, Radio NZ Intl	17675pa	
0200	0300	as	Philippines, Radio Pilipinas 15270me	12015me	15120me
0200	0300		Russia, Voice of 5995me 9765na 15445na 15595na	6155na	7180na
0200	0300		Sierra Leone, Radio UNAMSIL	6139af	
0200	0300		Singapore, Mediacorp Radio	6150do	
0200	0300	vl	Solomon Islands, SIBC 5020do	9545do	
0200	0300		Sri Lanka, SLBC 6005as	9770as	15745as
0200	0300		Taiwan, Radio Taiwan Intl 11875as 15320as 15465as	5950na	9680na
0200	0300		UK, BBC World Service 9410me 9525ca 9750af 12095sa 15280as 15310as	5975ca 9825sa 15360as	6195eu 11955as 17790as
0200	0300		USA, Armed Forces Radio 5765usb 6350usb 7507usb 12579usb 13362usb	4319usb 10320usb	5446usb 12133usb 13855usb
0200	0300		USA, KAIJ Dallas TX 5755va		
0200	0300		USA, KTBN Salt Lake City UT	7505na	
0200	0300		USA, KWHR Naalehu HI	17510as	
0200	0300		USA, Voice of America 7200va 11705va 11705va 11820va 17740va 17820va	7255va 15250va	9850va 15290va
0200	0300	mtwhfa	USA, WBCQ Kennebunk ME	5105na	
0200	0300		USA, WBOH Newport NC	5920am	
0200	0300		USA, WEWN Birmingham AL	5825va	
0200	0300		USA, WHRA Greenbush ME	7580va	
0200	0300		USA, WHRI Noblesville IN	5745va	7315am
0200	0300		USA, WINB Red Lion PA	9320am	
0200	0300		USA, WJIE Louisville KY	13595am	
0200	0300	twhfa	USA, WRMI Miami FL 7385na		
0200	0300	sm	USA, WSHB Cypress Creek SC	7535na	
0200	0300	mh	USA, WSHB Cypress Creek SC	9430ca	
0200	0300		USA, WTJC Newport NC	9370na	
0200	0300		USA, WWCR Nashville TN 5935na 7465na	3210na	5070na
0200	0300		USA, WWRB Manchester TN 6890na	5050na	5085na
0200	0300		USA, WYFR Okeechobee FL 9505na 9985sa 11855ca	5985na	6065na
0200	0300	vl	Vanuatu, Radio 3945al	7260do	
0200	0300		Zambia, Christian Voice	4965do	
0215	0220		Nepal, Radio 3230as 7164as	5005as	6100as
0230	0257		Vietnam, Voice of 6175na		
0230	0300		Sweden, Radio 9495na		
0245	0300	twhfas	Albania, Radio Tirana Intl	6115na	7160na
0245	0300		UK, BBC World Service	9610af	
0250	0300		Vatican City, Vatican Radio	7305am	9605am
0250	0300		Zambia, Radio 4910do		

0300 UTC - 10PM EST / 9PM CST / 7PM PST

0300	0310		Vatican City, Vatican Radio 9660af 17665as	7305am	9605am
0300	0315		Croatia, Voice of 7285na		
0300	0330		Australia, HCJB 15555pa		
0300	0330	sm w fa	Belarus, Radio Belarus Intl	5970eu	7210eu
0300	0330		Egypt, Radio Cairo 11780na		
0300	0330	as	Philippines, Radio Pilipinas 15270me	12015me	15120me
0300	0330		Thailand, Radio 15460na		
0300	0330	a	UK, Wales Radio Intl 9735na		
0300	0330		USA, KJES Vado NM 7555na		
0300	0355		South Africa, Channel Africa	3345af	9770af
0300	0356		China, China Radio Intl	9690na	9790na
0300	0356		North Korea, Voice of 3560as 9345as	6195as	7140as
0300	0356		Romania, Radio Romania Intl	6040na	9515na
0300	0359		New Zealand, Radio NZ Intl	17675pa	
0300	0400		Anguilla, Caribbean Beacon	6090am	
0300	0400		Australia, ABC NT Alice Springs	2310irr	4835do
0300	0400		Australia, ABC NT Katherine	5025do	
0300	0400		Australia, ABC NT Tennant Creek	4910do	
0300	0400		Australia, Radio 9660pa 15415as 15515va 17580pa	12080va 17750as	15240pa 21725as
0300	0400	vl	Botswana, Radio 4820do	4830al	7255do
0300	0400		Bulgaria, Radio 7400na	9400na	
0300	0400		Canada, CBC Northern Service	9625do	
0300	0400		Canada, CFRX Toronto ON	6070do	
0300	0400		Canada, CFVP Calgary AB	6030do	
0300	0400		Canada, CKZN St John's NF	6160do	
0300	0400		Canada, CKZU Vancouver BC	6160do	
0300	0400		Costa Rica, University Network 7375am 9725sa 11870am	5030am 13750na	6150am 17645as
0300	0400		Cuba, Radio Havana 6000na	9820na	
0300	0400	1st a	Finland, Scandinavian Weekend Radio 11720eu		5980eu
0300	0400		Guyana, Voice of 3291do	5950do	
0300	0400		Japan, Radio 21610pa		
0300	0400		Malaysia, RTM Radio 4	7295do	
0300	0400		Namibia, Namibian BC Corp 6090af	3270af	3290af
0300	0400		Oman, Radio 15355af		
0300	0400		Russia, Voice of 6155na 15445na 15595na	7180na	7350na
0300	0400		Sierra Leone, Radio UNAMSIL	6139af	
0300	0400		Singapore, Mediacorp Radio	6150do	
0300	0400	vl	Solomon Islands, SIBC 5020do	9545do	
0300	0400		Sri Lanka, SLBC 6005as	9770as	15745as
0300	0400		Taiwan, Radio Taiwan Intl 11875as 15125sa 15320as	5950na	9680na
0300	0400		Uganda, Radio 4976do	5026do	7196do
0300	0400		UK, BBC World Service 6005af 6190af 9525am 9750af 15280as 15310as 17760as 17790as	6195eu 11760me	3255af 5975ca 9410eu 11765af 12035af 15360as 15410af 15575me 21660as
0300	0400		USA, Armed Forces Radio 5765usb 6350usb 7507usb 12579usb	4319usb 10320usb 13362usb	5446usb 12133usb 13855usb
0300	0400		USA, KAIJ Dallas TX 5755va		
0300	0400		USA, KTBN Salt Lake City UT	7505na	
0300	0400		USA, KWHR Naalehu HI	17510as	
0300	0400		USA, Voice of America 4960af 7265af 7290af 9885af	6035af 7340af	6080af 7415af 9575af
0300	0400		USA, WBCQ Kennebunk ME	7415na	9330na
0300	0400	mtwhfa	USA, WBCQ Kennebunk ME	5105na	
0300	0400		USA, WBOH Newport NC	5920am	
0300	0400		USA, WEWN Birmingham AL	5825va	
0300	0400		USA, WHRA Greenbush ME	7580va	
0300	0400		USA, WHRI Noblesville IN	5745va	7315am
0300	0400		USA, WINB Red Lion PA	9320am	
0300	0400		USA, WJIE Louisville KY	13595am	
0300	0400		USA, WRMI Miami FL 7385na		
0300	0400	m	USA, WSHB Cypress Creek SC	5850eu	7535eu
0300	0400		USA, WTJC Newport NC	9370na	
0300	0400		USA, WWCR Nashville TN 5935na 7465na	3210na	5070na
0300	0400		USA, WWRB Manchester TN 6890na	5050na	5085na
0300	0400		USA, WYFR Okeechobee FL 11740sa	6065na	9505na
0300	0400	vl	Vanuatu, Radio 3945al	7260do	
0300	0400		Zambia, Radio 4910do		
0300	0400		Zambia, Radio Christian Voice	6065do	
0300	0400	vl	Zimbabwe, ZBC Corp 5975do		
0310	0330		Vatican City, Vatican Radio	9660af	17665as
0320	0330		Vatican City, Vatican Radio	9660af	
0330	0357		Vietnam, Voice of 6175na		
0330	0358		Hungary, Radio Budapest	9835na	
0330	0400	twhfas	Albania, Radio Tirana Intl	6165eu	7160eu
0330	0400		Malaysia, Radio Malaysia Kota Kinabalu		5979do
0330	0400		Sweden, Radio 9495na		
0330	0400		UAE, Radio Dubai 12005na 17890na	13675na	15400na
0330	0400		UK, BBC World Service 9670eu	7130eu	7265eu
0345	0400		Tajikistan, Tajik Radio 7245as		

Shortwave Guide

0400 UTC - 11PM EST / 10PM CST / 8PM PST

0400	0427		Czech Rep, Radio Prague Intl	6200na	7345na
0400	0430		France, Radio France Intl	9805af	11995af
0400	0430		South Africa, Channel Africa	3345af	
0400	0430		Sri Lanka, SLBC 6005as	9770as	15745as
0400	0450		Turkey, Voice of 6020va	7240eu	
0400	0455		Netherlands, Radio 6165na	9590na	
0400	0456		China, China Radio Intl	6190na	9755na
0400	0500		Anguilla, Caribbean Beacon	6090am	
0400	0500		Australia, ABC NT Alice Springs	2310irr	4835do
0400	0500		Australia, ABC NT Katherine	5025do	
0400	0500		Australia, ABC NT Tennant Creek	4910do	
0400	0500		Australia, Radio 9660pa	12080va	15240pa
			15415as 15515va 17580pa	17750as	21725as
0400	0500	vl	Botswana, Radio 4820do	4830al	7255do
0400	0500		Canada, CBC Northern Service	9625do	
0400	0500		Canada, CFRX Toronto ON	6070do	
0400	0500		Canada, CKZN St John's NF	6160do	
0400	0500		Canada, CKZU Vancouver BC	6160do	
0400	0500		Costa Rica, University Network	5030am	6150am
			7375am 9725sa 11870am	13750na	17645as
0400	0500		Cuba, Radio Havana 6000na	9820na	
0400	0500	1st a	Finland, Scandinavian Weekend Radio		5980eu
			11720eu		
0400	0500		Germany, Deutsche Welle	6180af	9545af
			9710af		
0400	0500		Germany, Overcomer Ministries	9770au	
0400	0500		Guyana, Voice of 3291do	5950do	
0400	0500		Malaysia, Radio Malaysia Kota Kinabalu		5979do
0400	0500		Malaysia, RTM Radio 4	7295do	
0400	0500		Namibia, Namibian BC Corp	3270af	3290af
			6090af		
0400	0500		New Zealand, Radio NZ Intl	15340pa	
0400	0500		Russia, Voice of 7125na	7180na	7240na
			7350na 12010na 15445na	15595na	
0400	0500		Sierra Leone, Radio UNAMSIL	6139af	
0400	0500		Singapore, Mediacorp Radio	6150do	
0400	0500	vl	Solomon Islands, SIBC 5020do	9545do	
0400	0500		Uganda, Radio 4976do	5026do	7196do
0400	0500		UK, BBC World Service	3255af	5975am
			6005af 6135ca 6190af	6195eu	7160af
			9410eu 11760me 11765af	12035af	15280as
			15310as 15360as 15420af	15575me	17760as
			17790as 21660as		
0400	0500	DRM	UK, BBC World Service	6010af	
0400	0500		Ukraine, Radio Ukraine Intl	5905na	
0400	0500		USA, Armed Forces Radio	4319usb	5446usb
			5765usb 6350usb 7507usb	10320usb	12133usb
			12579usb 13362usb	13855usb	
0400	0500		USA, KAIJ Dallas TX 5755va		
0400	0500		USA, KTBN Salt Lake City UT	7505na	
0400	0500		USA, KWHR Naalehu HI	17780as	
0400	0500		USA, Voice of America 4960af	6080af	7170va
			7290af 7415af 9475af	9575af	9885af
			15205va		
0400	0500	mtwhfa	USA, WBCQ Kennebunk ME	5105na	7415na
0400	0500	s	USA, WBCQ Kennebunk ME	9330na	
0400	0500		USA, WBOH Newport NC	5920am	
0400	0500		USA, WEWN Birmingham AL	5825na	
0400	0500		USA, WHRA Greenbush ME	7580va	
0400	0500		USA, WHRI Noblesville IN	5745va	7315am
0400	0500		USA, WINB Red Lion PA	9320am	
0400	0500		USA, WJIE Louisville KY	13595am	
0400	0500	mtwhf	USA, WMLK Bethel PA 9465eu		
0400	0500		USA, WRMI Miami FL 7385na		
0400	0500	mtha	USA, WSHB Cypress Creek SC	12020va	
0400	0500		USA, WTJC Newport NC	9370na	
0400	0500		USA, WWCR Nashville TN	3210na	5070na
			5935na 7465na		
0400	0500		USA, WWRB Manchester TN	5050na	5085na
			6890na		
0400	0500		USA, WYFR Okeechobee FL	6065na	6855va
			7355va 9505na		
0400	0500	vl	Vanuatu, Radio 3945al	7260do	
0400	0500		Zambia, Radio 4910do		
0400	0500		Zambia, Radio Christian Voice	6065do	
0400	0500	vl	Zimbabwe, ZBC Corp 5975do		
0430	0457		Czech Rep, Radio Prague Intl	9865va	11600va
0430	0500	s	Austria, AWR Europe 9875me		
0430	0500		Nigeria, Radio/Enugu 6025do		
0430	0500		Nigeria, Radio/Ibadan	6050do	
0430	0500		Nigeria, Radio/Kaduna	4770do	6090do
0430	0500		Nigeria, Radio/Lagos 3326do	4990do	
0430	0500		Swaziland, TWR 4775af	6120af	
0445	0500		Italy, RAI Intl 5965af	6100af	7230af

0500 UTC - 12AM EST / 11PM CST / 9PM PST

0500	0515		Israel, Kol Israel 9435va	11605va	17600va
0500	0529		Belgium, Radio Vlaanderen Intl	9590na	
0500	0530		France, Radio France Intl	11850af	13610af
0500	0530	DRM/ as	Netherlands, Radio 15255va		
0500	0530		South Africa, AWR Africa	5960af	6015af
0500	0530		UK, BBC World Service	15280as	17885af
0500	0530	as	UK, BBC World Service	7295eu	9670eu
			11845eu		
0500	0530		Vatican City, Vatican Radio	7360af	9660af
			11625af		
0500	0556		China, China Radio Intl	6190na	9560na
0500	0600		Anguilla, Caribbean Beacon	6090am	
0500	0600		Australia, ABC NT Alice Springs	2310irr	4835do
0500	0600		Australia, ABC NT Katherine	5025do	
0500	0600		Australia, ABC NT Tennant Creek	4910do	
0500	0600		Australia, Radio 9660pa	12080va	15240pa
			15415as 15515va 17580pa	17750as	21725as
0500	0600	mtwhf	Bhutan, Bhutan BC Service	5030al	6035do
0500	0600	vl	Botswana, Radio 4820do	4830al	7255do
0500	0600		Canada, CBC Northern Service	9625do	
0500	0600		Canada, CFRX Toronto ON	6070do	
0500	0600		Canada, CKZN St John's NF	6160do	
0500	0600		Canada, CKZU Vancouver BC	6160do	
0500	0600		Costa Rica, University Network	5030am	6150am
			7375am 9725sa 11870am	13750na	17645as
0500	0600		Cuba, Radio Havana 9550am	9820na	11760na
0500	0600	1st a	Finland, Scandinavian Weekend Radio		6170eu
			11720eu		
0500	0600	1st a	Finland, Scandinavian Weekend Radio		6170va
			11690eu		
0500	0600		Germany, Deutsche Welle	9565af	11805af
			12045af 15410af		
0500	0600	vl	Greece, Voice of 9420eu	12105eu	
0500	0600		Guyana, Voice of 3291do	5950do	
0500	0600		Japan, Radio 5975eu	6110na	7230eu
			11715eu 11760as 15195as	17810as	21755pa
0500	0600		Kuwait, Radio 15110as		
0500	0600		Malaysia, Radio Malaysia Kota Kinabalu		5979do
0500	0600		Malaysia, RTM Radio 4	7295do	
0500	0600		Namibia, Namibian BC Corp	6060af	6175al
0500	0600		New Zealand, Radio NZ Intl	15340pa	
0500	0600		Nigeria, Radio/Enugu 6025do		
0500	0600		Nigeria, Radio/Ibadan	6050do	
0500	0600		Nigeria, Radio/Kaduna	4770do	6090do
0500	0600		Nigeria, Radio/Lagos 3326do	4990do	
0500	0600		Nigeria, Voice of 17800af		
0500	0600		Russia, Voice of 7125na	7180na	7240na
			12010na 15445na 15595na		
0500	0600		Sierra Leone, Radio UNAMSIL	6139af	
0500	0600		Singapore, Mediacorp Radio	6150do	
0500	0600	vl	Solomon Islands, SIBC 5020do	9545do	
0500	0600		South Africa, Channel Africa	9525af	11710af
0500	0600		Swaziland, TWR 6120af	7205af	9500af
0500	0600		Uganda, Radio 4976do	5026do	7196do
0500	0600		UK, BBC World Service	6005af	6135ca
			6190af 6195eu 7160af	9410eu	11760me
			11765af 11940af 11955as	15310as	15360as
			15420af 15565eu 15575me	17640af	17760as
			17790as 21660as		
0500	0600		USA, Armed Forces Radio	4319usb	5446usb
			5765usb 6350usb 7507usb	10320usb	12133usb
			12579usb 13362usb	13855usb	
0500	0600		USA, KAIJ Dallas TX 5755va		
0500	0600		USA, KTBN Salt Lake City UT	7505na	
0500	0600		USA, KWHR Naalehu HI	17780as	
0500	0600		USA, Voice of America 6035af	6080af	6105af
			7170va 7295af 9700va	11825va	11835af
			13710af 15205va		
0500	0600		USA, WBCQ Kennebunk ME	7415na	
0500	0600	twhfa	USA, WBCQ Kennebunk ME	9330na	
0500	0600	m	USA, WBCQ Kennebunk ME	5105na	
0500	0600		USA, WBOH Newport NC	5920am	
0500	0600		USA, WEWN Birmingham AL	5825na	7570va
0500	0600		USA, WHRA Greenbush ME	7580af	
0500	0600		USA, WHRI Noblesville IN	5745va	7315am
0500	0600		USA, WINB Red Lion PA	9320am	
0500	0600		USA, WJIE Louisville KY	13595am	
0500	0600	mtwhf	USA, WMLK Bethel PA 9465eu		
0500	0600		USA, WRMI Miami FL 7385na		
0500	0600	m	USA, WSHB Cypress Creek SC	7535eu	
0500	0600		USA, WSHB Cypress Creek SC	12020af	
0500	0600		USA, WTJC Newport NC	9370na	
0500	0600		USA, WWCR Nashville TN	3210na	5070na
			5935na 7560na		
0500	0600		USA, WWRB Manchester TN	5050na	5085na
			6890na		
0500	0600		USA, WYFR Okeechobee FL	6855eu	7520eu
0500	0600	vl	Vanuatu, Radio 3945al	7260do	
0500	0600		Zambia, Radio Christian Voice	6065do	
0500	0600	vl	Zimbabwe, ZBC Corp 5975do		
0515	0525		Rwanda, Radio 6005do		
0525	0600	vl	Ghana, Ghana BC Corp	3366do	4915do
0530	0545		UK, BBC World Service	6010eu	9865eu
0530	0550		UAE, Radio Dubai 13675au	15435au	17830au
			21700au		
0530	0600	s	Austria, AWR Europe 11905me		
0530	0600		South Africa, AWR Africa	15345af	
0530	0600		Thailand, Radio 13780eu		
0530	0600	mtwhf	UK, BBC World Service	17885af	

Shortwave Guide

0600 UTC - 1AM EST / 12AM CST / 10PM PST

0600	0615		South Africa, TWR	11640af		
0600	0620		Vatican City, Vatican Radio	4005eu	5890eu	7250eu
0600	0630		France, Radio France Intl	11725af	15155af	17800af
0600	0630		South Africa, AWR Africa	15345af		
0600	0630		Swaziland, TWR	6120af	7205af	9500af
0600	0700		Anguilla, Caribbean Beacon	6090am		
0600	0700		Australia, ABC NT Alice Springs	2310irr	4835do	
0600	0700		Australia, ABC NT Katherine	5025do		
0600	0700		Australia, ABC NT Tennant Creek	4910do		
0600	0700		Australia, Radio	9660pa	12080va	15240pa
			15415as 15515va	17580pa	17750as	21725as
0600	0700	vl	Botswana, Radio	4820do	4830al	7255do
0600	0700		Canada, CFRX Toronto ON	6070do		
0600	0700		Canada, CFVP Calgary AB	6030do		
0600	0700		Canada, CKZN St John's NF	6160do		
0600	0700		Canada, CKZU Vancouver BC	6160do		
0600	0700		Costa Rica, University Network	5030am	6150am	
			7375am 9725sa	11870am	13750na	17645as
0600	0700		Cuba, Radio Havana	9550am	9820na	11760na
0600	0700	1st a	Finland, Scandinavian Weekend Radio			6170eu
			11690eu			
0600	0700		Georgia, Radio Georgia	11805eu		
0600	0700		Germany, Deutsche Welle	6140eu	7225af	
			11785af 15410af			
0600	0700	DRM	Germany, Deutsche Welle	21675af		
0600	0700	vl	Ghana, Ghana BC Corp	3366do	4915do	
0600	0700		Guyana, Voice of	3291do	5950do	
0600	0700		Japan, Radio	7230eu	11690am	11740as
			15195as 17870pa	21755pa		
0600	0700	DRM	Kuwait, Radio	15110as		
0600	0700		Kuwait, Radio	15110as		
0600	0700		Liberia, ELWA	4760do		
0600	0700		Malaysia, RTM Radio 4	7295do		
0600	0700		Malaysia, Voice of	6175as	9665as	9750as
			15295au			
0600	0700		Namibia, Namibian BC Corp	6060af	6175al	
0600	0700		New Zealand, Radio NZ Intl	15340pa		
0600	0700		Nigeria, Radio/Enugu	6025do		
0600	0700		Nigeria, Radio/Ibadan	6050do		
0600	0700		Nigeria, Radio/Kaduna	4770do	6090do	
0600	0700		Nigeria, Radio/Lagos	3326do	4990do	
0600	0700		Nigeria, Voice of	17800af		
0600	0700		Papua New Guinea, NBC	4890do	9675irr	
0600	0700		Russia, Voice of	21790pa		
0600	0700		Sierra Leone, Radio UNAMSIL	6139af		
0600	0700		Singapore, Mediacorp Radio	6150do		
0600	0700	vl	Solomon Islands, SIBC	5020do	9545do	
0600	0700		South Africa, Channel Africa	9525af	15215af	
0600	0700		Swaziland, TWR	7205af	9500af	
0600	0700	as	UK, BBC World Service	17885af		
0600	0700		UK, BBC World Service	6055af	6190af	
			6195eu 7160af	9410eu	11765af	11940af
			11955as 12095eu	15310as	15360as	15400af
			15565eu 15575me	17640af	17760as	17790as
			21660as			
0600	0700		USA, Armed Forces Radio	4319usb	5446usb	
			5765usb 6350usb	7507usb	10320usb	12133usb
			12579usb	13362usb	13855usb	
0600	0700		USA, KAIJ Dallas TX	5755va		
0600	0700		USA, KTBN Salt Lake City UT	7505na		
0600	0700		USA, KWHR Naalehu HI	17780as		
0600	0700		USA, Voice of America	5995va	6035af	6080af
			6105af 7170va	7295af	11825va	11835af
			11930va 11995af	15205va		
0600	0700	m	USA, WBCQ Kennebunk ME	5105na		
0600	0700	twhfa	USA, WBCQ Kennebunk ME	9330na		
0600	0700		USA, WBOH Newport NC	5920am		
0600	0700		USA, WEWN Birmingham AL	5825na	7570va	
0600	0700		USA, WHRA Greenbush ME	7580af		
0600	0700		USA, WHRI Noblesville IN	5745va	7315am	
0600	0700		USA, WJIE Louisville KY	13595am		
0600	0700		USA, WRMI Miami FL	7385na		
0600	0700	mwfa	USA, WSHB Cypress Creek SC	7535af		
0600	0700		USA, WTJC Newport NC	9370na		
0600	0700		USA, WWCR Nashville TN	3210na	5070na	
			5935na 7560na			
0600	0700		USA, WWRB Manchester, TN	5050na	5085na	
			6890na			
0600	0700		USA, WYFR Okeechobee FL	7355eu	11530eu	
			11580eu			
0600	0700	vl	Vanuatu, Radio	3945al	4960do	7260irr
0600	0700		Yemen, Rep of Yemen Radio	9780me		
0600	0700		Zambia, Radio Christian Voice	9865do		
0600	0700	vl	Zimbabwe, ZBC Corp	5975do		
0605	0630	s	Austria, Radio Austria Intl	17870me		
0630	0645	as	UK, BBC World Service	9875eu		
0630	0700		Vatican City, Vatican Radio	9660af	11625af	13765af
0630	2000	mtwha	Germany, AWR Europe	9840eu		
0635	0700	s	Austria, Radio Austria Intl	17870me		

0700 UTC - 2AM EST / 1AM CST / 11PM PST

0700	0705		New Zealand, Radio NZ Intl	15340pa		
0700	0715		Croatia, Voice of	9470pa		
0700	0726		Romania, Radio Romania Intl	11775na	15105na	
0700	0727		Slovakia, Radio Slovakia Intl	13715au	15460au	
			17550au			
0700	0730	a	Tibet, Xizang PBS	9490as	9580as	
0700	0730	as	UK, BBC World Service	17885af		
0700	0745		USA, WYFR Okeechobee FL	7355eu	9985af	
0700	0800		Anguilla, Caribbean Beacon	6090am		
0700	0800		Australia, ABC NT Alice Springs	2310irr	4835do	
0700	0800		Australia, ABC NT Katherine	5025do		
0700	0800		Australia, ABC NT Tennant Creek	4910do		
0700	0800		Australia, Radio	9660pa	12080va	15240pa
			15415as 17580pa	17750as	21725as	
0700	0800	vl	Botswana, Radio	4820do	4830al	7255do
0700	0800		Canada, CFRX Toronto ON	6070do		
0700	0800		Canada, CFVP Calgary AB	6030do		
0700	0800		Canada, CKZN St John's NF	6160do		
0700	0800		Canada, CKZU Vancouver BC	6160do		
0700	0800		Costa Rica, University Network	5030am	6150am	
			7375am 9725sa	11870am	13750na	17645as
0700	0800		Eqt Guinea, Radio Africa	15184af		
0700	0800	1st a	Finland, Scandinavian Weekend Radio			6170eu
			11690eu			
0700	0800		France, Radio France Intl	15605af		
0700	0800	DRM	Germany, Deutsche Welle	21675af		
0700	0800		Germany, Deutsche Welle	6140eu		
0700	0800	vl	Ghana, Ghana BC Corp	3366do	4915do	
0700	0800		Guyana, Voice of	3291do	5950do	
0700	0800	DRM	Kuwait, Radio	15110as		
0700	0800		Kuwait, Radio	15110as		
0700	0800		Liberia, ELWA	4760do		
0700	0800		Malaysia, Radio Malaysia Kota Kinabalu			5979do
0700	0800		Malaysia, RTM Radio 4	7295do		
0700	0800		Malaysia, Voice of	6175as	9665as	9750as
			15295au			
0700	0800		Myanmar, Radio	9730do		
0700	0800		Nigeria, Radio Enugu	6025do		
0700	0800		Nigeria, Radio/Ibadan	6050do		
0700	0800		Nigeria, Radio/Kaduna	4770do	6090do	
0700	0800		Nigeria, Radio/Lagos	3326do	4990do	
0700	0800		Nigeria, Voice of	17800af		
0700	0800		Papua New Guinea, NBC	4890do	9675irr	
0700	0800		Russia, Voice of	21790pa		
0700	0800		Sierra Leone, Radio UNAMSIL	6139af		
0700	0800		Singapore, Mediacorp Radio	6150do		
0700	0800	vl	Solomon Islands, SIBC	5020do	9545do	
0700	0800		South Africa, Channel Africa	9525af		
0700	0800		Swaziland, TWR	7205af	9500af	
0700	0800		Taiwan, Radio Taiwan Intl	5950na		
0700	0800		UK, BBC World Service	6190af	6195eu	
			9410eu 11760me	11765af	11940af	11955as
			12095eu 15310as	15360as	15400af	15485eu
			15565eu 17640eu	17760as	17790as	21660as
0700	0800		USA, Armed Forces Radio	4319usb	5446usb	
			5765usb 6350usb	7507usb	10320usb	12133usb
			12579usb	13362usb	13855usb	
0700	0800		USA, KTBN Salt Lake City UT	7505na		
0700	0800		USA, KWHR Naalehu HI	11565pa	17780as	
0700	0800	m	USA, WBCQ Kennebunk ME	5105na		
0700	0800		USA, WBCQ Kennebunk ME	7415na		
0700	0800		USA, WBOH Newport NC	5920am		
0700	0800		USA, WEWN Birmingham AL	5825na	7570va	
0700	0800		USA, WHRA Greenbush ME	7580af		
0700	0800		USA, WHRI Noblesville IN	5745va	7315am	
0700	0800	mtwhf	USA, WMLK Bethel PA	9465eu		
0700	0800		USA, WRMI Miami FL	7385na		
0700	0800	th	USA, WSHB Cypress Creek SC	7535af		
0700	0800	mtwhas	USA, WSHB Cypress Creek SC	9845pa		
0700	0800		USA, WTJC Newport NC	9370na		
0700	0800		USA, WWCR Nashville TN	3210na	5070na	
			5935na 7560na			
0700	0800	vl	Vanuatu, Radio	3945al	4960do	7260irr
0700	0800		Zambia, Radio Christian Voice	9865do		
0705	0720		UK, BBC World Service	6005af		
0706	0800		New Zealand, Radio NZ Intl	11675pa		
0715	0730		UK, BBC World Service	15575me		
0730	0745	mtwhf	Vatican City, Vatican Radio	4005eu	5890eu	
			6185eu 7250eu	9645va	11740eu	15595va
0730	0800		Australia, HCJB	11750pa		
0730	0800		Bulgaria, Radio	11600eu	13600eu	
0730	0800	as	Guam, TWR/KTWR	15205as		
0730	0800		Switzerland, Swiss Radio Intl	9885af	13790af	
			17665af			
0730	0800	as	UK, BBC World Service	15575me	17885af	
0740	0800	mtwhf	Guam, TWR/KTWR	15205as		
0745	0800	as	Albania, TWR	12070eu		
0745	0800		Guam, TWR/KTWR	15330as		
0745	0800	as	Monaco, TWR	9870eu		
0755	0800	mtwhf	Albania, TWR	12070eu		
0755	0800	mtwhf	Monaco, TWR	9870eu		

0800 UTC - 3AM EST / 2AM CST / 12AM PST

0800	0804		Pakistan, Radio	17835eu	21465eu	
0800	0825		Malaysia, Voice of	6175as	9665as	9750as
			15295au			
0800	0827		Czech Rep, Radio Prague Intl		7345eu	9880eu
0800	0829		Belgium, Radio Vlaanderen Intl		5965eu	
0800	0830		Australia, ABC NT Katherine		5025do	
0800	0830		Australia, ABC NT Tennant Creek		4910do	
0800	0830		Malaysia, Radio Malaysia Kota Kinabalu			5979do
0800	0830		Myanmar, Radio	9730do		
0800	0850	a	Monaco, TWR	9870eu		
0800	0900	smtwhf	Albania, TWR	12070eu		
0800	0900		Anguilla, Caribbean Beacon		6090am	
0800	0900		Australia, ABC NT Alice Springs		2310irr	4835do
0800	0900		Australia, HCJB	11750pa		
0800	0900	as	Australia, Radio	17750as		
0800	0900		Australia, Radio	5995pa	9580va	9710pa
			11880as 12080va	15240va	15415as	17750as
			21725as			
0800	0900	mtwhf	Bhutan, Bhutan BC Service		5030al	6035do
0800	0900	vl	Botswana, Radio	4820do	4830al	7255do
0800	0900		Canada, CFRX Toronto ON		6070do	
0800	0900		Canada, CFVP Calgary AB		6030do	
0800	0900		Canada, CKZN St John's NF		6160do	
0800	0900		Canada, CKZU Vancouver BC		6160do	
0800	0900		Costa Rica, University Network		5030am	6150am
			7375am 9725sa	11870am	13750na	17645as
0800	0900		Eqt Guinea, Radio Africa		15184af	
0800	0900	1st a	Finland, Scandinavian Weekend Radio			6170eu
			11690eu			
0800	0900		Germany, Bible Voice Broadcasting		5975eu	
0800	0900		Germany, Deutsche Welle		6140eu	
0800	0900	DRM	Germany, Deutsche Welle		15440af	21675af
0800	0900	vl	Ghana, Ghana BC Corp		3366do	4915do
0800	0900	as	Guam, TWR/KTWR	15205as		
0800	0900		Guam, TWR/KTWR	15330as		
0800	0900	mtwhf	Guam, TWR/KTWR	15205as		
0800	0900		Guyana, Voice of	3291do	5950do	
0800	0900		Indonesia, Voice of	9525pa	15150as	
0800	0900		Liberia, ELWA	4760do		
0800	0900	m-f/ DRM	Luxembourg, RTL Radio Lutzebuerg		6095eu	
0800	0900		Malaysia, RTM Radio 4		7295do	
0800	0900	mtwhfs	Monaco, TWR	9870eu		
0800	0900		New Zealand, Radio NZ Intl		11675pa	
0800	0900		Nigeria, Radio Enugu	6025do		
0800	0900		Nigeria, Radio/Ibadan		6050do	
0800	0900		Nigeria, Radio/Kaduna		4770do	6090do
0800	0900		Nigeria, Radio/Lagos	3326do	4990do	
0800	0900		Nigeria, Voice of	17800af		
0800	0900		Papua New Guinea, NBC		4890do	9675irr
0800	0900		Russia, Voice of	17495pa	17525pa	17665pa
			21790pa			
0800	0900		Sierra Leone, Radio UNAMSIL		6139af	
0800	0900		Singapore, Mediacorp Radio		6150do	
0800	0900	vl	Solomon Islands, SIBC	5020do	9545do	
0800	0900	s	South Africa, Amateur Radio League			9750af
			17780af			
0800	0900	a	South Africa, Radio League		9750af	17780af
0800	0900		South Korea, Radio Korea Intl		9570as	13670eu
0800	0900		Swaziland, TWR	7205af	9500af	
0800	0900		Taiwan, Radio Taiwan Intl		9610au	
0800	0900		UK, BBC World Service		6190af	9410eu
			11760me 11940af	11955as	12095eu	15310as
			15360as 15400af	15485eu	15565eu	17640eu
			17760as 17790as	17830af	17885af	21470af
			21660as			
0800	0900	as	UK, BBC World Service		15575me	
0800	0900		USA, Armed Forces Radio		4319usb	5446usb
			5765usb 6350usb	7507usb	10320usb	12133usb
			12579usb	13362usb	13855usb	
0800	0900		USA, KNLS Anchor Point AK		9690as	
0800	0900		USA, KTBN Salt Lake City UT		7505na	
0800	0900		USA, KWHR Naalehu HI		9930as	11565pa
0800	0900		USA, WBOH Newport NC		5920am	
0800	0900		USA, WEWN Birmingham AL		5825na	
0800	0900		USA, WHRI Noblesville IN		5745va	7315am
0800	0900		USA, WJIE Louisville KY		13595am	
0800	0900	mtwhf	USA, WMLK Bethel PA	9465eu		
0800	0900		USA, WRMI Miami FL	7385na		
0800	0900	as	USA, WSHB Cypress Creek SC		7535eu	9845pa
0800	0900		USA, WTJC Newport NC		9370na	
0800	0900		USA, WWCR Nashville TN		3210na	5070na
			5935na 7560na			
0800	0900		USA, WYFR Okeechobee FL		9985eu	
0800	0900	vl	Vanuatu, Radio	3945al	4960do	7260irr
0800	0900		Zambia, Radio Christian Voice		9865do	
0815	0900	as	Guam, TWR/KTWR	15330as		
0830	0900		Australia, ABC NT Katherine		2485do	
0830	0900		Australia, ABC NT Tennant Creek		2325do	
0830	0900		Austria, AWR Europe	9660af	17670af	
0830	0900		Georgia, Radio Georgia		11910eu	
0830	0900		Switzerland, Swiss Radio Intl		21770af	
0840	0850		Turkmenistan, Turkmen Radio		4930do	

0900 UTC - 4AM EST / 3AM CST / 1AM PST

0900	0915	as	Germany, Bible Voice Broadcasting		5975eu	
0900	0915	vl	Ghana, Ghana BC Corp		3366do	4915do
0900	0920	smtwhf	Albania, TWR	12070eu		
0900	0920	s	Monaco, TWR	9870eu		
0900	0930	as	Australia, Radio	17750as		
0900	0930		Austria, AWR Europe	17670af		
0900	0930	mtwhf	Guam, TWR/KTWR	15330as		
0900	0930		Guam, TWR/KTWR	15330as		
0900	0930	as/vl	Italy, IRRS	13840va		
0900	0956		China, China Radio Intl		15250pa	17690pa
0900	1000		Anguilla, Caribbean Beacon		6090am	
0900	1000		Australia, ABC NT Alice Springs		2310do	4835irr
0900	1000		Australia, ABC NT Katherine		2485do	
0900	1000		Australia, ABC NT Tennant Creek		2325do	
0900	1000		Australia, HCJB	11750pa		
0900	1000		Australia, Radio	9580va	11880as	15240as
			17750as 21820as			
0900	1000		Australia, Voice Intl	11955as		
0900	1000	vl	Botswana, Radio	4820do	4830al	7255do
0900	1000		Canada, CFRX Toronto ON		6070do	
0900	1000		Canada, CFVP Calgary AB		6030do	
0900	1000		Canada, CKZN St John's NF		6160do	
0900	1000		Canada, CKZU Vancouver BC		6160do	
0900	1000		Costa Rica, University Network		5030am	6150am
			7375am 9725sa	11870am	13750na	17645as
0900	1000		Eqt Guinea, Radio Africa		15184af	
0900	1000	1st a	Finland, Scandinavian Weekend Radio			6170eu
			11690eu			
0900	1000	DRM mtwhf	Germany, Deutsche Welle			17700af
0900	1000		Germany, Deutsche Welle		6140eu	15440af
0900	1000	DRM	Germany, Deutsche Welle		21675af	
0900	1000		Guyana, Voice of	3291do	5950do	
0900	1000	m-f/ DRM	Luxembourg, RTL Radio Lutzebuerg		6095eu	
0900	1000		Malaysia, RTM Radio 4		7295do	
0900	1000	s	Malta, Voice of the Mediterranean		9630eu	
0900	1000		New Zealand, Radio NZ Intl		11675pa	
0900	1000		Nigeria, Radio Enugu	6025do		
0900	1000		Nigeria, Radio/Ibadan		6050do	
0900	1000		Nigeria, Radio/Kaduna		4770do	6090do
0900	1000		Nigeria, Radio/Lagos	3326do	4990do	
0900	1000		Nigeria, Voice of	17800af		
0900	1000		Palua, KHBN	15725as		
0900	1000		Papua New Guinea, NBC		4890do	9675irr
0900	1000		Russia, Voice of	17495pa	17525pa	17665pa
0900	1000		Singapore, Mediacorp Radio		6150do	
0900	1000	vl	Solomon Islands, SIBC	5020do	9545do	
0900	1000	s	UAE, Radio UNMEE	21460af		
0900	1000		UK, BBC World Service		6190af	6195as
			9605as 9740as	11760me	11940af	12095eu
			15190sa 15310as	15360as	15400af	15485eu
			15565eu 15575me	17640eu	17760as	17790as
			17830af 17885af	21470af	21660as	
0900	1000		USA, Armed Forces Radio		4319usb	5446usb
			5765usb 6350usb	7507usb	10320usb	12133usb
			12579usb	13362usb	13855usb	
0900	1000		USA, KTBN Salt Lake City UT		7505na	
0900	1000		USA, KWHR Naalehu HI		9930as	11565pa
0900	1000		USA, WBOH Newport NC		5920am	
0900	1000		USA, WEWN Birmingham AL		5825na	
0900	1000		USA, WHRA Greenbush ME		7580af	
0900	1000		USA, WHRI Noblesville, IN		5745va	7315am
0900	1000		USA, WJIE Louisville KY		13595am	
0900	1000		USA, WRMI Miami FL	7385na		
0900	1000		USA, WTJC Newport NC		9370na	
0900	1000		USA, WWCR Nashville TN		3210na	5070na
			5935na 7560na			
0900	1000	vl	Vanuatu, Radio	3945al	4960do	7260irr
0900	1000		Zambia, Radio Christian Voice		9865do	
0910	0930	s	Armenia, Voice of	4810eu	15270as	
0930	1000		Georgia, Radio Georgia		11910me	
0930	1000		Greece, Voice of	9420eu	12105eu	15630eu
0930	1000		Lithuania, Radio Vilnius		9710eu	

1000 UTC - 5AM EST / 4AM CST / 2AM PST

1000	1027		Vietnam, Voice of	9840as	12020as	
1000	1029		Czech Rep, Radio Prague Intl		21745va	
1000	1030		Germany, Deutsche Welle		6205as	15190as
			17820as			
1000	1030	DRM	Germany, Deutsche Welle		6140eu	15440eu
1000	1030		Guam, AWR/KSDA	11705as	11900as	
1000	1030		Mongolia, Voice of	12015as		
1000	1030		UK, BBC World Service		9605as	15360as
1000	1030	as	UK, BBC World Service		15190sa	15400af
			17830af			
1000	1030		UK, RTE Radio	15280au		
1000	1045		USA, KWHR Naalehu HI		9930as	11565pa
1000	1055		Netherlands, Radio	7260as	9785au	12065as
			12070pa 12080pa	13820as	15595pa	
1000	1055	DRM	Netherlands, Radio	9850pa		
1000	1056		China, China Radio Intl		15250pa	17690pa
1000	1056		North Korea, Voice of	3560as	9335am	9850as

			11709am 11735as			
1000	1100		Anguilla, Caribbean Beacon	11775am		
1000	1100		Australia, ABC NT Alice Springs	2310do	4835irr	
1000	1100		Australia, ABC NT Katherine	2485do		
1000	1100		Australia, ABC NT Tennant Creek	2325do		
1000	1100		Australia, HCJB 11750pa			
1000	1100		Australia, Radio 9580va	11880as	15240as	
			17750as 21820as			
1000	1100		Australia, Voice Intl 11955as	13685as		
1000	1100	as	Bhutan, Bhutan BC Service	5030al	6035do	
1000	1100		Canada, CFRX Toronto ON	6070do		
1000	1100		Canada, CFVP Calgary AB	6030do		
1000	1100		Canada, CKZN St John's NF	6160do		
1000	1100		Canada, CKZU Vancouver BC	6160do		
1000	1100		Costa Rica, University Network	5030am	6150am	
			7375am 9725sa 11870am	13750na	17645as	
1000	1100		Eqt Guinea, Radio Africa	15184af		
1000	1100	1st a	Finland, Scandinavian Weekend Radio		6170eu	
			11720eu			
1000	1100	mtwhf	Germany, Deutsche Welle	17700va		
1000	1100		Guyana, Voice of 3291do	5949do		
1000	1100		India, All India Radio 7270as	13710as	15020as	
			15235as 15260as 17510au	17800as	17895au	
1000	1100	as/vl	Italy, IRRS 13840va			
1000	1100		Japan, Radio 6120na	9695as	11730as	
			17585eu 21755pa			
1000	1100	m-f/ DRM	Luxembourg, RTL Radio Lutzebuerg	6095eu		
1000	1100		Malaysia, RTM Radio 4	7295do		
1000	1100		New Zealand, Radio NZ Intl	11675pa		
1000	1100		Palau, KHBN 15725as			
1000	1100		Papua New Guinea, NBC	4890do	9675irr	
1000	1100		Singapore, Mediacorp Radio	6150do		
1000	1100	vl	Solomon Islands, SIBC 5020do	9545do		
1000	1100		South Africa, Radio Veritas	7240af		
1000	1100		UK, BBC World Service	6190af	6195va	
			9740as 11760me 12095eu	15190sa	15310as	
			15485eu 15565eu 15575me	17640eu	17760as	
			17790as 17885af 21470af			
1000	1100		USA, Armed Forces Radio	4319usb	5446usb	
			5765usb 6350usb 7507usb	10320usb	12133usb	
			12579usb 13362usb	13855usb		
1000	1100		USA, KTBN Salt Lake City UT	7505na		
1000	1100		USA, WBOH Newport NC	5920am		
1000	1100		USA, WEWN Birmingham AL	5825na		
1000	1100		USA, WHRI Noblesville IN	9495am	9840na	
1000	1100		USA, WJIE Louisville KY	13595am		
1000	1100		USA, WRMI Miami FL 9955am			
1000	1100	mthfas	USA, WSHB Cypress Creek SC	11780as		
1000	1100	a	USA, WSHB Cypress Creek SC	9455am		
1000	1100		USA, WTJC Newport NC	9370na		
1000	1100		USA, WWCR Nashville TN	5070na	5935na	
			7560na 9475na			
1000	1100		USA, WYFR Okeechobee FL	5950na		
1000	1100	mtwhfa.vl	Vanuatu, Radio 3945al	4960do	7260irr	
1000	1100		Zambia, Radio Christian Voice	9865do		
1030	1045	mtwhf	Ethiopia, Radio 5990do	7110do	9704do	
1030	1100		Germany, Deutsche Welle	6140as	15440va	
1030	1100	DRM	Germany, Deutsche Welle	6140eu	15440eu	
1030	1100		Guam, AWR/KSDA 11900as			
1030	1100		Iran, Voice of the Islamic Rep	15385as	15555as	
			15480as 21470as 21730as			
1030	1100		UAE, Radio Dubai 13675eu	15395eu	17865eu	
			21605eu			
1030	1100	t	UAE, Radio UNMEE 21550af			
1030	1100		UK, BBC World Service	9605as	11945as	
			15285as 21660as			
1030	1100	as	UK, BBC World Service	15400af	17830af	
1030	1100	mt hfa	Vatican City, Vatican Radio	5890eu		
1045	1100		USA, KWHR Naalehu HI	9930as		
1045	1100	as	USA, KWHR Naalehu HI	11565pa		

1100 UTC - 6AM EST / 5AM CST / 3AM PST

1100	1104		Pakistan, Radio 17835eu	21465eu		
1100	1115	mtwhfa.vl	Vanuatu, Radio 3945al	4960do	7260irr	
1100	1127		Vietnam, Voice of 7285as			
1100	1130		Australia, HCJB 11750pa			
1100	1130	as	Bhutan, Bhutan BC Service	5030al	6035do	
1100	1130		Iran, Voice of the Islamic Rep	15385as	15555as	
			15480as 21470as 21730as			
1100	1130		Tibet, Xizang PBS 4905as	4920as	6200as	
			7385as 9490as			
1100	1130	t	UAE, Radio UNMEE 21550af			
1100	1130		UK, BBC World Service	15400af		
1100	1130	mtwhf	UK, BBC World Service	6195ca	15190ca	
1100	1155	DRM	Netherlands, Radio 21780eu			
1100	1155		Netherlands, Radio 9850va			
1100	1200		Anguilla, Caribbean Beacon	11775am		
1100	1200		Australia, ABC NT Alice Springs	2310do	4835irr	
1100	1200		Australia, ABC NT Katherine	2485do		
1100	1200		Australia, ABC NT Tennant Creek	2325do		
1100	1200		Australia, Radio 5995pa	6020pa	9475as	
			9580va 11650va 11880as	12080va	15240va	
			21820as			
1100	1200		Australia, Voice Intl 13685as			
1100	1200		Canada, CFRX Toronto ON	6070do		
1100	1200		Canada, CFVP Calgary AB	6030do		
1100	1200		Canada, CKZN St John's NF	6160do		
1100	1200		Canada, CKZU Vancouver BC	6160do		
1100	1200		Costa Rica, University Network	5030am	6150am	
			7375am 9725sa 11870am	13750na	17645as	
1100	1200		Ecuador, HCJB 21455va			
1100	1200	1st a	Finland, Scandinavian Weekend Radio		6170eu	
			11720eu			
1100	1200		Germany, Deutsche Welle	17670as	21650as	
1100	1200	DRM	Germany, Deutsche Welle	6140eu	15440eu	
1100	1200	DRM mtwhf	Germany, Deutsche Welle		17710af	
1100	1200	s	Germany, Overcomer Ministries	6110eu		
1100	1200	as/vl	Italy, IRRS 13840va			
1100	1200		Japan, Radio 6120na	9695as	11730as	
1100	1200	m-f/ DRM	Luxembourg, RTL Radio Lutzebuerg	6095eu		
1100	1200		Malaysia, RTM Radio 4	7295do		
1100	1200		New Zealand, Radio NZ Intl	15530pa		
1100	1200		Papua New Guinea, NBC	4890do	9675irr	
1100	1200		Singapore, Radio Singapore Intl	6150as	9600as	
1100	1200		South Africa, Channel Africa	9525af		
1100	1200		South Africa, Radio Veritas	7240af		
1100	1200		Taiwan, Radio Taiwan Intl	7445as		
1100	1200		UK, BBC World Service	6190af	6195va	
			9740as 11760me 11940af	12095eu	15190am	
			15310as 15485eu 15565eu	15575me	17640eu	
			17760as 17790as 17830af	17885af	21470af	
1100	1200		USA, Armed Forces Radio	4319usb	5446usb	
			5765usb 6350usb 7507usb	10320usb	12133usb	
			12579usb 13362usb	13855usb		
1100	1200		USA, KTBN Salt Lake City UT	7505na		
1100	1200	as	USA, KWHR Naalehu HI	11565pa		
1100	1200		USA, KWHR Naalehu HI	9930as		
1100	1200		USA, WBOH Newport NC	5920am		
1100	1200		USA, WEWN Birmingham AL	5825na		
1100	1200		USA, WHRI Noblesville IN	9495am	9840na	
1100	1200		USA, WINB Red Lion PA	9320am		
1100	1200		USA, WJIE Louisville KY	13595am		
1100	1200		USA, WRMI Miami FL 9955am			
1100	1200	fas	USA, WSHB Cypress Creek SC	6095am		
1100	1200		USA, WTJC Newport NC	9370na		
1100	1200		USA, WWCR Nashville TN	5070na	5935na	
			7560na 15825na			
1100	1200		USA, WYFR Okeechobee FL	5950na	7355na	
			9555sa 11725sa 11830na			
1100	1200		Zambia, Radio Christian Voice	9865do		
1110	1120		Israel, Kol Israel 15640va	17545va		
1115	1145		Nepal, Radio 3230as	5005as	6100as	
			7164as			
1130	1145		Germany, Bible Voice Broadcasting	13590as		
1130	1145		UK, BBC World Service	7135as	11920as	
1130	1157		Czech Rep, Radio Prague Intl	11640eu	21745va	
1130	1159		Belgium, Radio Vlaanderen Intl	9945as		
1130	1200		South Korea, Radio Korea Intl	9650na		
1130	1200	a	UK, Wales Radio Intl 17625au			
1130	1200	f	Vatican City, Vatican Radio	15595va	17515va	
1145	1155		Rwanda, Radio 6055do			
1145	1200		Germany, Bible Voice Broadcasting	13590as		

1200 UTC - 7AM EST / 6AM CST / 4AM PST

1200	1215	vl	Cambodia, National Radio Of	11940as		
1200	1230		France, Radio France Intl	17815af	25820af	
1200	1230		South Korea, Radio Korea Intl	9650na		
1200	1230		UAE, AWR Africa 15135as			
1200	1230	as	UK, BBC World Service	6195ca	15190am	
1200	1230		Uzbekistan, Radio Tashkent Intl	5060as	5975as	
			6025as 9715as			
1200	1255		Netherlands, Radio 5965na			
1200	1255	DRM	Netherlands, Radio 21780eu			
1200	1256		China, China Radio Intl	9730as	9760pa	
			11760pa 11980as 15415pa			
1200	1259		Canada, Radio Canada Intl	9795as	11730as	
1200	1300		Anguilla, Caribbean Beacon	11775am		
1200	1300		Australia, ABC NT Alice Springs	2310do	4835irr	
1200	1300		Australia, ABC NT Katherine	2485do		
1200	1300		Australia, ABC NT Tennant Creek	2325do		
1200	1300		Australia, Radio 5995pa	6020pa	9475as	
			9580va 11650va 11880as	21820as		
1200	1300		Australia, Voice Intl 13685as			
1200	1300		Canada, CBC Northern Service	9625do		
1200	1300		Canada, CFRX Toronto ON	6070do		
1200	1300		Canada, CFVP Calgary AB	6030do		
1200	1300		Canada, CKZN St John's NF	6160do		
1200	1300		Canada, CKZU Vancouver BC	6160do		
1200	1300		Costa Rica, University Network	5030am	6150am	
			7375am 9725sa 11870am	13750na	17645as	
1200	1300		Ecuador, HCJB 21455va			
1200	1300	1st a	Finland, Scandinavian Weekend Radio		6170eu	
			11720eu			
1200	1300	DRM	Germany, Deutsche Welle	9655eu	15440eu	
1200	1300		Germany, Overcomer Ministries	6110eu		
1200	1300	as/vl	Italy, IRRS 13840va			
1200	1300	m-f/ DRM	Luxembourg, RTL Radio Lutzebuerg	6095eu		
1200	1300		Malaysia, RTM Radio 4	7295do		
1200	1300		New Zealand, Radio NZ Intl	15530pa		
1200	1300		Papua New Guinea, NBC	4890do	9675irr	

1200	1300		Singapore, Radio Singapore Intl	6150as	9600as	
1200	1300		South Africa, Channel Africa	9525af		
1200	1300		South Africa, Radio Veritas	7240af		
1200	1300		Taiwan, Radio Taiwan Intl	7130as		
1200	1300		UK, BBC World Service	6190af	6195as	
			9740as 11760me 11940af	12095eu	15310as	
			15485eu 15565eu 15575me	17640eu	17760as	
			17790as 17830af 17885af	21470af		
1200	1300		Ukraine, Radio Ukraine Intl	15520eu		
1200	1300		USA, Armed Forces Radio	4319usb	5446usb	
			5765usb 6350usb 7507usb	10320usb	12133usb	
			12579usb 13362usb	13855usb		
1200	1300		USA, KTBN Salt Lake City UT	7505na		
1200	1300		USA, KWHR Naalehu HI	9930as		
1200	1300	as	USA, KWHR Naalehu HI	11565pa		
1200	1300		USA, Voice of America 6110va	9645va	9760va	
			11705va 11715va 15250va	15425va		
1200	1300		USA, WBOH Newport NC	5920am		
1200	1300		USA, WEWN Birmingham AL	5825na		
1200	1300		USA, WHRI Noblesville IN	9495am	9840na	
1200	1300		USA, WINB Red Lion PA	9320am		
1200	1300		USA, WJIE Louisville KY	13595am		
1200	1300		USA, WRMI Miami FL 15725na			
1200	1300		USA, WSHB Cypress Creek SC	9585va		
1200	1300	a	USA, WSHB Cypress Creek SC	9455am		
1200	1300		USA, WTJC Newport NC	9370na		
1200	1300		USA, WWCR Nashville TN	5070na	5935na	
			7560na 15825na			
1200	1300		USA, WYFR Okeechobee FL	5950na	7355na	
			11830na 11970na 13695na			
1200	1300		Zambia, Radio Christian Voice	9865do		
1215	1245	m	Germany, Bible Voice Broadcasting	13590as		
1215	1300		Egypt, Radio Cairo 15445al	17670as		
1230	1245		UK, BBC World Service	15425af	17780af	
			21640af			
1230	1257		Vietnam, Voice of 9840as	12020as		
1230	1300		Australia, HCJB 15390pa			
1230	1300		Bangladesh, Bangla Betar	7185as	9550as	
			15520eu			
1230	1300		Bulgaria, Radio 11700eu	15700eu		
1230	1300		Sri Lanka, SLBC 6005as	9770as	15745as	
1230	1300		Thailand, Radio 9810as			

1300 UTC - 8AM EST / 7AM CST / 5AM PST

1300	1310	mtwhfa	Turkmenistan, Turkmen Radio	5015do		
1300	1330		Ecuador, HCJB 21455va			
1300	1330		Egypt, Radio Cairo 15445al	17670as		
1300	1355		Poland, Radio Polonia	9525eu	11820eu	
1300	1356		China, China Radio Intl	9570na	9755pa	
			11760pa 11900as 11980as	15180as		
1300	1356		North Korea, Voice of 4405as	7505eu	9335na	
			11335eu 11710am			
1300	1356		Romania, Radio Romania Intl	15170eu	17720eu	
			17745eu			
1300	1400		Anguilla, Caribbean Beacon	11775am		
1300	1400		Australia, HCJB 15390pa			
1300	1400		Australia, Radio 5995pa	6020pa	9580va	
			11650va 11660as 21820as			
1300	1400		Australia, Voice Intl 13685as			
1300	1400		Canada, CBC Northern Service	9625do		
1300	1400		Canada, CFRX Toronto ON	6070do		
1300	1400		Canada, CFVP Calgary AB	6030do		
1300	1400		Canada, CKZN St John's NF	6160do		
1300	1400		Canada, CKZU Vancouver BC	6160do		
1300	1400	mtwhf	Canada, Radio Canada Intl	9515am	13655am	
			17820am			
1300	1400		Costa Rica, University Network	5030am	6150am	
			7375am 9725sa 11870am	13750na	17645as	
1300	1400	1st a	Finland, Scandinavian Weekend Radio		6170eu	
			11720eu			
1300	1400		Germany, Deutsche Welle	6140eu	9655va	
			15440va			
1300	1400		Germany, Overcomer Ministries	6110eu	13810me	
1300	1400	as/vl	Italy, IRRS 13840va			
1300	1400		Jordan, Radio 11690eu			
1300	1400	m-f/ DRM	Luxembourg, RTL Radio Lutzebuerg	6095eu		
1300	1400		Malaysia, RTM Radio 4	7295do		
1300	1400		New Zealand, Radio NZ Intl	6095pa		
1300	1400		Papua New Guinea, NBC	4890do	9675irr	
1300	1400		Singapore, Radio Singapore Intl	6150as	9600as	
1300	1400		South Africa, Radio Veritas	7240af		
1300	1400		South Korea, Radio Korea Intl	9570as	13670as	
1300	1400		Sri Lanka, SLBC 6005as	9770as	15745as	
1300	1400		UK, BBC World Service	6190af	6195va	
			9740as 11760me 11940af	12095eu	15190am	
			15310as 15420af 15485eu	15565eu	15575me	
			17640eu 17760as 17790as	17830af	17885af	
			21470af			
1300	1400		USA, Armed Forces Radio	4319usb	5446usb	
			5765usb 6350usb 7507usb	10320usb	12133usb	
			12579usb 13362usb	13855usb		
1300	1400		USA, KNLS Anchor Point AK	9690as		
1300	1400		USA, KTBN Salt Lake City UT	7505na		
1300	1400		USA, KWHR Naalehu HI	9930as		
1300	1400		USA, Voice of America 6110va	9760va	11705va	
			15425va			
1300	1400	mtwhf	USA, WBCQ Kennebunk ME	17495na		
1300	1400		USA, WBOH Newport NC	5920am		
1300	1400		USA, WEWN Birmingham AL	9955na		
1300	1400		USA, WHRA Greenbush ME	17560af		
1300	1400		USA, WHRI Noblesville IN	9840na	15105am	
1300	1400		USA, WINB Red Lion PA	9930am		
1300	1400		USA, WJIE Louisville KY	13595am		
1300	1400		USA, WRMI Miami FL 15725na			
1300	1400		USA, WSHB Cypress Creek SC	7340as		
1300	1400	as	USA, WSHB Cypress Creek SC	9430na		
1300	1400	f	USA, WSHB Cypress Creek SC	9455ca		
1300	1400		USA, WTJC Newport NC	9370na		
1300	1400		USA, WWCR Nashville TN	7560na	12160na	
			13845na 15825na			
1300	1400		USA, WYFR Okeechobee FL	7355na	11560as	
			11740na 11830na 11970na	13695na		
1300	1400		Zambia, Radio Christian Voice	9865do		
1305	1330	as	Austria, Radio Austria Intl	6155eu	13730eu	
1315	1320	mtwhf	Austria, Radio Austria Intl	17855as		
1330	1345		UK, BBC World Service	15105af	21640af	
1330	1350		UAE, Radio Dubai 13630eu	13675eu	15395eu	
			17865eu 21605eu			
1330	1357		Vietnam, Voice of 7280eu	9730eu		
1330	1400	m th a	Guam, AWR/KSDA 15660as			
1330	1400		Guam, AWR/KSDA 11755as			
1330	1400		India, All India Radio 9690as	11620as	13710as	
1330	1400		Serbia & Montenegro, Intl Radio	11835au		
1330	1400		Sweden, Radio 9430va	17505va	18960va	
1330	1400	DRM	Sweden, Radio 9815eu			
1330	1400		Turkey, Voice of 15155va	15195eu		
1330	1400		UAE, AWR Africa 9860as	15235as		
1330	1400		Uzbekistan, Radio Tashkent Intl	5060as	5975as	
			6025as 9715as			
1335	1345	as	Austria, Radio Austria Intl	6155eu	13730eu	
1345	1400		Austria, Radio Austria Intl	6155eu	13730eu	
1345	1400	mtwhf	Austria, Radio Austria Intl	17855as		

1400 UTC - 9AM EST / 8AM CST / 6AM PST

1400	1415	fa	Germany, Bible Voice Broadcasting	7485as		
1400	1415		Seychelles, FEBA 9445as			
1400	1415	mtw	UK, BBC World Service	11860af	15420af	
			21490af			
1400	1420		Turkey, Voice of 15155as	15195eu		
1400	1429		Czech Rep, Radio Prague Intl	21745va		
1400	1430		Netherlands, Radio 12070as	12080as	15595as	
1400	1430		Thailand, Radio 9560as			
1400	1456		China, China Radio Intl	9755na	11675as	
			11765af 13685af 15125na	17720na		
1400	1500		Anguilla, Caribbean Beacon	11775am		
1400	1500		Australia, HCJB 15390pa			
1400	1500		Australia, Radio 5995va	6080pa	9580va	
			11650va 11750as 11660as			
1400	1500		Australia, Voice Intl 13635as			
1400	1500		Canada, CBC Northern Service	9625do		
1400	1500		Canada, CFRX Toronto ON	6070do		
1400	1500		Canada, CFVP Calgary AB	6030do		
1400	1500		Canada, CKZN St John's NF	6160do		
1400	1500		Canada, CKZU Vancouver BC	6160do		
1400	1500		Canada, Radio Canada Intl	9515am	13655am	
			17820am			
1400	1500	DRM	Canada, Radio Canada Intl	9815eu		
1400	1500		Costa Rica, University Network	5030am	6150am	
			7375am 9725sa 11870am	13750na	17645as	
1400	1500	1st a	Finland, Scandinavian Weekend Radio		6170eu	
			11720eu			
1400	1500		France, Radio France Intl	7175as	11610as	
			17515as 17620as			
1400	1500		Germany, Deutsche Welle	6140eu		
1400	1500		Germany, Overcomer Ministries	6110eu	13810eu	
			21590sa			
1400	1500		India, All India Radio 9690as	11620as	13710as	
1400	1500		Japan, Radio 7200as	9845as	11840va	
			17755va			
1400	1500		Jordan, Radio 11690eu			
1400	1500	m-f/ DRM	Luxembourg, RTL Radio Lutzebuerg	6095eu		
1400	1500		New Zealand, Radio NZ Intl	6095pa		
1400	1500		Oman, Radio 15140eu			
1400	1500		Singapore, Mediacorp Radio	6150do		
1400	1500	as	South Africa, Channel Africa	9525af		
1400	1500		Sri Lanka, SLBC 6005as	9770as	15745as	
1400	1500		Taiwan, Radio Taiwan Intl	15265as		
1400	1500		UK, BBC World Service	6190af	6195as	
			7160as 9740as 11940af	12095eu	15190am	
			15310as 15485eu 15565eu	15575me	17640eu	
			17790as 17830af 21470af	21660af		
1400	1500		USA, Armed Forces Radio	4319usb	5446usb	
			5765usb 6350usb 7507usb	10320usb	12133usb	
			12579usb 13362usb	13855usb		
1400	1500		USA, KJES Vado NM 11715na			
1400	1500		USA, KTBN Salt Lake City UT	7505na		
1400	1500		USA, KWHR Naalehu HI	9930as		
1400	1500		USA, Voice of America 6110va	7125va	9645va	
			9760va 11705va 15205va	15425va		
1400	1500	mtwhf	USA, WBCQ Kennebunk ME	17495na		

1400	1500		USA, WBOH Newport NC	5920am		
1400	1500		USA, WEWN Birmingham AL	9955na		
1400	1500		USA, WHRA Greenbush ME	17560af		
1400	1500		USA, WHRI Noblesville IN	9840na	15105am	
1400	1500		USA, WINB Red Lion PA	9930am		
1400	1500		USA, WJIE Louisville KY	13595am		
1400	1500		USA, WRMI Miami FL 15725na			
1400	1500		USA, WTJC Newport NC	9370na		
1400	1500		USA, WWCR Nashville TN 13845na 15825na	9475na	12160na	
1400	1500	mtwhf	USA, WWRB Manchester, TN	9320na	12172na	
1400	1500		USA, WYFR Okeechobee FL 11830na 17760am	11560as	11740na	
1400	1500		Zambia, Radio Christian Voice	9865do		
1415	1420		Nepal, Radio 7164as	3230as	5005as	6100as
1415	1430	ha	Germany, Bible Voice Broadcasting	7485as		
1430	1445	s ha	Germany, Bible Voice Broadcasting	7485as		
1430	1500	s	Germany, Pan American BC	13605me		
1430	1500		Myanmar, Radio	5040do	5985do	
1430	1500	DRM	Netherlands, Radio	9815eu		
1430	1500		Netherlands, Radio	12070as	12080as	15595as
1430	1500		Sweden, Radio	17505va	18960va	
1445	1500	as	Germany, Bible Voice Broadcasting	7485as		
1445	1500		Guam, TWR/KTWR	15330as		
1445	1500	mtwhfa	UK, BBC World Service 15425as	6140as	7205as	
1500	1530		Mongolia, Voice of	9720as		

1500 UTC - 10AM EST / 9AM CST / 7AM PST

1500	1530		UK, BBC World Service 21490af	11860af	15420af	
1500	1545		Guam, TWR/KTWR	15330as		
1500	1555		Netherlands, Radio	12070as	12080as	15595as
1500	1556		China, China Radio Intl 11675as 11765as	7160as	9785as	
			13685af	15125af	17720na	
1500	1556		North Korea, Voice of 11335eu 11710am	4405as	7505eu	9335am
1500	1559		Canada, Radio Canada Intl 11935as 13655am	9515am	9635as	
			17820am			
1500	1600		Anguilla, Caribbean Beacon	11775am		
1500	1600		Australia, HCJB	15390pa		
1500	1600		Australia, Radio 9580va 11650va	5995va	6080pa	9475as
			11660as	11750as		
1500	1600		Australia, Voice Intl	13635as		
1500	1600		Canada, CBC Northern Service	9625do		
1500	1600		Canada, CFRX Toronto ON	6070do		
1500	1600		Canada, CFVP Calgary AB	6030do		
1500	1600		Canada, CKZN St John's NF	6160do		
1500	1600		Canada, CKZU Vancouver BC	6160do		
1500	1600		Costa Rica, University Network 7375am 9725sa	5030am	6150am	
			11870am	13750na	17645as	
1500	1600	1st a	Finland, Scandinavian Weekend Radio 11720eu		5990eu	
1500	1600		Germany, Deutsche Welle	6140eu		
1500	1600		Germany, Overcomer Ministries 21590sa	6110eu	13810eu	
1500	1600	s	Germany, Pan American BC	12015me		
1500	1600		Japan, Radio 9845as	7200as	9505am	9750as
1500	1600		Jordan, Radio	11690na		
1500	1600	m-f/ DRM	Luxembourg, RTL Radio Lutzebuerg	6095eu		
1500	1600		Myanmar, Radio	5040do	5985do	
1500	1600		New Zealand, Radio NZ Intl	6095pa		
1500	1600		Russia, Voice of 7350as 11500as	6205as	7260as	7315as
1500	1600		Seychelles, FEBA	7340as		
1500	1600		Singapore, Mediacorp Radio	6150do		
1500	1600		South Africa, Channel Africa	9525af	17770af	
1500	1600		Sri Lanka, SLBC	6005as	9770as	15745as
1500	1600		UK, BBC World Service 6195as 7160as 12095eu 15190am 15565eu 17790as	5975as	6190af	
				9410eu	9740as	11940af
				15310as	15400af	15485eu
				17830af	21470af	21660af
1500	1600		USA, Armed Forces Radio 5765usb 6350usb 12579usb	4319usb	5446usb	
				7507usb	10320usb	12133usb
				13362usb	13855usb	
1500	1600		USA, KJES Vado NM	11715na		
1500	1600		USA, KTBN Salt Lake City UT	15590na		
1500	1600		USA, KWHR Naalehu HI	9930as		
1500	1600		USA, Voice of America 9645va 9760va 15395va 15460va	6110va	7125va	9575va
				9765va	9825va	15205va
1500	1600	mtwhf	USA, WBCQ Kennebunk ME	17495na		
1500	1600		USA, WBOH Newport NC	5920am		
1500	1600		USA, WEWN Birmingham AL	9955na		
1500	1600		USA, WHRA Greenbush ME	17650af		
1500	1600		USA, WHRI Noblesville IN	9840na	15105am	
1500	1600		USA, WINB Red Lion PA	9930am		
1500	1600		USA, WJIE Louisville KY	13595am		
1500	1600		USA, WRMI Miami FL 15725na			
1500	1600		USA, WTJC Newport NC	9370na		
1500	1600		USA, WWCR Nashville TN 13845na 15825na	9475na	12160na	
1500	1600	mtwhf	USA, WWRB Manchester, TN	9320na	12172na	
1500	1600		USA, WYFR Okeechobee FL 15520as 17760na	6280as	11830na	
1500	1600		Zambia, Radio Christian Voice	4965do		
1515	1530	as	Germany, Bible Voice Broadcasting	9860me		
1515	1530		Vatican City, Vatican Radio 15235as	9865as	13765as	
1530	1600		Germany, Bible Voice Broadcasting	9860me		
1530	1600	m whfa	Germany, Bible Voice Broadcasting	9705as		
1530	1600		Iran, Voice of the Islamic Rep 9610as 11775as 11835as	7115as	7190as	
1530	1600		UAE, AWR Africa	15225as		
1530	1600		UK, BBC World Service	11685as	15540as	
1530	1600	a	Vatican City, Vatican Radio 15235af	9865af	13765af	
1540	1550		Turkmenistan, Turkmen Radio	4930do		

1600 UTC - 11AM EST / 10AM CST / 8AM PST

1600	1615		Pakistan, Radio 15725af 17820af	9320me	11570me	11640af
1600	1627		Vietnam, Voice of	7280as	9730as	
1600	1628	s	Hungary, Radio Budapest	6025eu	9585eu	
1600	1630		Guam, AWR/KSDA	15495as		
1600	1630		Iran, Voice of the Islamic Rep 9610as 11775as 11835as	7115as	7190as	
1600	1630		Sri Lanka, SLBC	6005as	9770as	15745as
1600	1635		UAE, Radio Dubai 17865eu 21605eu	13630eu	13675eu	15395eu
1600	1656		China, China Radio Intl 13685af 15125af		7190af	9570af
1600	1656		North Korea, Voice of	3560as	9975af	11735af
1600	1659	as	Canada, Radio Canada Intl 17820am	9515am	13655am	
1600	1700		Anguilla, Caribbean Beacon	11775am		
1600	1700		Australia, HCJB	15390pa		
1600	1700		Australia, Radio 9580va 11650va 11660as	5995va	6080pa	9475as
1600	1700		Australia, Voice Intl	13635as		
1600	1700		Canada, CBC Northern Service	9625do		
1600	1700		Canada, CFRX Toronto ON	6070do		
1600	1700		Canada, CFVP Calgary AB	6030do		
1600	1700		Canada, CKZN St John's NF	6160do		
1600	1700		Canada, CKZU Vancouver BC	6160do		
1600	1700		Costa Rica, University Network 7375am 9725sa	5030am	6150am	
				11870am	13750na	17645as
1600	1700		Ethiopia, Radio 9560af 9704af	5990af	7110af	7165af
				11800af		
1600	1700	1st a	Finland, Scandinavian Weekend Radio 11720eu			5990eu
1600	1700		France, Radio France Intl 15160af 15605af	9730af	11615af	
				17605af	17850af	
1600	1700		Germany, Bible Voice Broadcasting	9860me		
1600	1700	DRM	Germany, Deutsche Welle	6140eu		
1600	1700		Germany, Deutsche Welle 11695as	6170as	7225as	
1600	1700	a	Germany, Overcomer Ministries	6110eu		
1600	1700		Jordan, Radio	11690na		
1600	1700		New Zealand, Radio NZ Intl	6095pa		
1600	1700		Russia, Voice of 6005me 7260as 9830me	4940va	4965va	4975va
1600	1700		South Korea, Radio Korea Intl 9870va	5975om	7255va	
1600	1700		Taiwan, Radio Taiwan Intl	11550as		
1600	1700		UK, BBC World Service 6190af 6195as 11940af 12095eu 15190am 15485eu 15565eu 17790as 21660af	3915as	5975as	
				7160as	9410eu	9510as
				15310as	15400af	
				17830af	21470af	
1600	1700		USA, Armed Forces Radio 5765usb 6350usb 12579usb	4319usb	5446usb	
				7507usb	10320usb	12133usb
				13362usb	13855usb	
1600	1700		USA, KTBN Salt Lake City UT	15590na		
1600	1700		USA, KWHR Naalehu HI	9930as		
1600	1700		USA, Voice of America 9575va 9645va 15205va 15225af 17640va 17715af	6035af	6110va	7125va
				9760va	13600va	13710af
				15395va	15240af	15445va
				17895af		
1600	1700	mtwhf	USA, WBCQ Kennebunk ME	17495na		
1600	1700		USA, WBOH Newport NC	5920am		
1600	1700		USA, WEWN Birmingham AL	13615na	17840af	
1600	1700		USA, WHRA Greenbush ME	17650af		
1600	1700		USA, WHRI Noblesville IN	13760va	15105am	
1600	1700		USA, WINB Red Lion PA	9930am		
1600	1700		USA, WJIE Louisville KY	13595am		
1600	1700	mtwhf	USA, WMLK Bethel PA	9465eu		
1600	1700		USA, WRMI Miami FL 15725na			
1600	1700	a	USA, WSHB Cypress Creek SC	17665af		
1600	1700		USA, WTJC Newport NC	9370na		
1600	1700		USA, WWCR Nashville TN 13845na 15825na	9475na	12160na	
1600	1700	mtwhf	USA, WWRB Manchester TN	9320na	12172na	
1600	1700		USA, WYFR Okeechobee FL 15520na 17760na	11830na	11865na	
			17790af	18980eu	21455eu	
1600	1700		Zambia, Radio Christian Voice	4965do		
1605	1610	as	Austria, Radio Austria Intl	17865na		
1610	1625		Austria, Radio Austria Intl	17865na		

1625	1630	as	Austria, Radio Austria Intl	17865na	
1630	1700		Egypt, Radio Cairo 9855af		
1630	1700		Georgia, Radio Georgia	6180me	
1630	1700		Guam, AWR/KSDA 11980as	15495as	
1630	1700	s	Ireland, Reflections Europe 12255eu	3910eu	6295eu
1630	1700		UK, BBC World Service	15420af	
1630	1700	as	UK, BBC World Service	11860af	21490af
1635	1640	as	Austria, Radio Austria Intl	17865na	
1640	1655		Austria, Radio Austria Intl	17865na	
1645	1700		Tajikistan, Tajik Radio 7245as		
1655	1700	as	Austria, Radio Austria Intl	17865na	

1700 UTC - 12PM EST / 11AM CST / 9AM PST

1700	1715	vl	Somalia, Radio Galkayo	6985va	9615va
1700	1727		Czech Rep, Radio Prague Intl	5930eu	17485af
1700	1727		Vietnam, Voice of 9725eu		
1700	1730		Azerbaijan, Voice of 6110eu	9155eu	
1700	1730		France, Radio France Intl	11615af	15605af
1700	1730		Guam, AWR/KSDA 11560me		
1700	1730		Jordan, Radio 11690na		
1700	1730	mtwhf	Moldova, Radio Pridnestrovye	5960eu	
1700	1745		UK, BBC World Service	6005eu	
1700	1756		China, China Radio Intl 13685af 15125af	7190af	9570af
1700	1800		Anguilla, Caribbean Beacon	11775am	
1700	1800		Australia, Radio 5995va 9580va 9815pa 11880va	6080pa	9475as
1700	1800		Australia, Voice Intl 13635as		
1700	1800		Canada, CBC Northern Service	9625do	
1700	1800		Canada, CFRX Toronto ON	6070do	
1700	1800		Canada, CFVP Calgary AB	6030do	
1700	1800		Canada, CKZN St John's NF	6160do	
1700	1800		Canada, CKZU Vancouver BC	6160do	
1700	1800		Costa Rica, University Network 7375am 9725sa 11870am	5030am 13750na	6150am 17645as
1700	1800		Egypt, Radio Cairo 9855af		
1700	1800		Eqt Guinea, Radio Africa	7189af	15184al
1700	1800	1st a	Finland, Scandinavian Weekend Radio 11720eu		5990eu
1700	1800	a w fa	Germany, Bible Voice Broadcasting	9860me	
1700	1800	as	Germany, Bible Voice Broadcasting	11650me	
1700	1800	DRM	Germany, Deutsche Welle	6140eu	
1700	1800		Germany, Radio Africa Intl	11735af	13820af
1700	1800	a	Greece, Voice of 9420na	15630eu	17705na
1700	1800	s	Ireland, Reflections Europe 12255eu	3910eu	6295eu
1700	1800		Japan, Radio 9535am	11970eu	15355af
1700	1800		New Zealand, Radio NZ Intl	6095pa	
1700	1800		Russia, Voice of 5910as	5945as	9830af
1700	1800		Swaziland, TWR 3200af	9500af	
1700	1800		Taiwan, Radio Taiwan Intl	11550as	
1700	1800		UK, BBC World Service 5975as 6190af 6195eu 9510as 9630af 12095eu 15420af 15565eu 17830af	3255af 7160as 15310as 21470af	3915as 9410eu 15400af
1700	1800		USA, Armed Forces Radio 5765usb 6350usb 7507usb 12579usb 13362usb	4319usb 10320usb 13855usb	5446usb 12133usb
1700	1800		USA, KTBN Salt Lake City UT	15590na	
1700	1800		USA, Voice of America 6040va 9645va 9760va 13710af 15395va 15445af 17895af	6110va 15205va	7125va 15240af
1700	1800	mtwhf	USA, Voice of America 5990va 9795va 11955va 12005va	6045va 13600af	9525va 15255va
1700	1800	mtwhf	USA, WBCQ Kennebunk ME	9330na	17495na
1700	1800		USA, WBOH Newport NC	5920am	
1700	1800		USA, WEWN Birmingham AL	13615na	17840af
1700	1800		USA, WHRA Greenbush ME	17650af	
1700	1800		USA, WHRI Noblesville IN	13760va	15105am
1700	1800		USA, WINB Red Lion PA	9930am	
1700	1800		USA, WJIE Louisville KY	13595am	
1700	1800	mtwhf	USA, WMLK Bethel PA 9465eu		
1700	1800		USA, WRMI Miami FL 15725na		
1700	1800	ta	USA, WSHB Cypress Creek SC	17505af	
1700	1800		USA, WTJC Newport NC	9370na	
1700	1800		USA, WWCR Nashville TN 13845na 15825na	9475na	12160na
1700	1800	smtwhf	USA, WWRB Manchester TN	9320na	12172na
1700	1800		USA, WYFR Okeechobee FL 21680af	18980eu	21455eu
1700	1800		Zambia, Radio Christian Voice	4965do	
1715	1730		Vatican City, Vatican Radio 7250eu 9645eu 15595va	4005eu	5890eu
1730	1726		Romania, Radio Romania Intl	9570eu	11940eu
1730	1740	vl	Libya, Voice of Africa 15220irr 17880irr	15615irr	15660irr
1730	1745	mtwhf	UK, United Nations Radio 17810af	7170af	15495me
1730	1800	s	Austria, AWR Europe 15385me		
1730	1800		Guam, AWR/KSDA 9385me		
1730	1800		Liberia, ELWA 4760do		
1730	1800	mtwhfa	Malta, Voice of the Mediterranean	6185eu	
1730	1800		Philippines, Radio Pilipinas 15190me	11730me	11890me
1730	1800		Slovakia, Radio Slovakia Intl 7345eu	5915eu	6055eu
1730	1800		Switzerland, Swiss Radio Intl 15555 skd1203	9755af	11810af
1730	1800		UK, BBC World Service 7105eu 7230af 9530eu	3390af 9685af	5875eu
1730	1800		Vatican City, Vatican Radio 17515af	13765af	15570af
1735	1745	vl/th	Paraguay, Radio Nacional	9739sa	
1745	1800		Bangladesh, Bangla Betar 15520eu	7185eu	9550eu
1745	1800		India, All India Radio 7410eu 11620eu 11935af 13605af 17670af	9445af 15075af	9950eu 15155af

1800 UTC - 1PM EST / 12PM CST / 10AM PST

1800	1810		Zanzibar, Voice of Tanzania	11734do	
1800	1815	a	Germany, Bible Voice Broadcasting	13845me	
1800	1815		Israel, Kol Israel 11605va	17545va	
1800	1827		Czech Rep, Radio Prague Intl	5930eu	9415va
1800	1827		Vietnam, Voice of 7280eu	9725eu	9730al
1800	1830		Egypt, Radio Cairo 9855af		
1800	1830	s	Germany, Universal Life	11840af	
1800	1830		South Africa, AWR Africa 11985af	5960af	7265af
1800	1830		UK, BBC World Service	5975as	9510as
1800	1830		UK, RTE Radio 9850me		
1800	1855		Poland, Radio Polonia	5995eu	7150eu
1800	1900		Anguilla, Caribbean Beacon	11775am	
1800	1900	mtwhf	Argentina, RAE 9690eu	15345eu	
1800	1900		Australia, HCJB 11765pa		
1800	1900		Australia, Radio 6080pa 9580va 9815pa 11880va	7240va	9475as
1800	1900		Australia, Voice Intl 11685as		
1800	1900		Bangladesh, Bangla Betar 15520eu	7185eu	9550eu
1800	1900		Canada, CBC Northern Service	9625do	
1800	1900		Canada, CFRX Toronto ON	6070do	
1800	1900		Canada, CFVP Calgary AB	6030do	
1800	1900		Canada, CKZN St John's NF	6160do	
1800	1900		Canada, CKZU Vancouver BC	6160do	
1800	1900		Costa Rica, University Network 7375am 9725sa 11870am	5030am 13750na	6150am 17645as
1800	1900		Eqt Guinea, Radio Africa	7189af	15184al
1800	1900	1st a	Finland, Scandinavian Weekend Radio 11720eu		6170eu
1800	1900		Germany, Radio Africa Intl	11735af	13820af
1800	1900		India, All India Radio 7410eu 11620eu 11935af 13605af 17670af	9445af 15075af	9950eu 15155af
1800	1900	s	Ireland, Reflections Europe 12255eu	3910eu	6295eu
1800	1900		Kuwait, Radio 11990va		
1800	1900		Latvia, Laser Radio	9290eu	
1800	1900		Liberia, ELWA	4760do	
1800	1900		Netherlands, Radio	6020af	9895af 11655af
1800	1900		New Zealand, Radio NZ Intl	11980pa	
1800	1900		Nigeria, Voice of 15120af	17800al	
1800	1900		Philippines, Radio Pilipinas 15190me	11730me	11890me
1800	1900		Russia, Voice of 5910as 9830af 11510af	5945as	7290eu
1800	1900	as	Russia, Voice of	5950eu	6175eu
1800	1900		Sierra Leone, Radio UNAMSIL	6139af	
1800	1900		South Africa, Channel Africa	15265af	
1800	1900	as	South Africa, Radio Lusofonia	3345af	
1800	1900	vl	Sudan, Radio Omdurman	7200do	9505do
1800	1900		Swaziland, TWR 3200af	9500af	
1800	1900		Taiwan, Radio Taiwan Intl	3955eu	
1800	1900		UK, BBC World Service 6190af 6195eu 9410eu 15310me 15400af 15420af	3255af 9630af 17830af	6055af 12095eu 21470af
1800	1900		USA, Armed Forces Radio 5765usb 6350usb 7507usb 12579usb 13362usb	4319usb 10320usb 13855usb	5446usb 12133usb
1800	1900		USA, KTBN Salt Lake City UT	15590na	
1800	1900		USA, Voice of America 6035af 9885va 11975af 13710af 17895af	6040va 15240af	9760va 15580af
1800	1900	mtwhfa	USA, WBCQ Kennebunk ME	9330na	17495na
1800	1900		USA, WBOH Newport NC	5920am	
1800	1900		USA, WEWN Birmingham AL	13615na	17840af
1800	1900		USA, WHRA Greenbush ME	17650af	
1800	1900		USA, WHRI Noblesville IN	9495am	13760va
1800	1900		USA, WINB Red Lion PA	9930am	
1800	1900		USA, WJIE Louisville KY	13595am	
1800	1900	mtwhf	USA, WMLK Bethel PA 9465eu		
1800	1900		USA, WRMI Miami FL 15725na		
1800	1900	a	USA, WSHB Cypress Creek SC	15665eu	17505af
1800	1900		USA, WTJC Newport NC	9370na	
1800	1900		USA, WWCR Nashville TN 13845na 15825na	9475na	12160na
1800	1900	smtwhf	USA, WWRB Manchester TN	9320na	12172na
1800	1900		USA, WYFR Okeechobee FL	18980eu	
1800	1900		Yemen, Rep of Yemen Radio	9780me	

1800	1900		Zambia, Radio Christian Voice	4965do		
1820	1830	vl	Libya, Voice of Africa	11635irr	11715irr	11860irr
			17880irr			
1830	1845		Germany, IBRA Radio	9520af		
1830	1845	m w	UK, BBC World Service	6050eu	7105eu	
			9685eu			
1830	1859		Belgium, Radio Vlaanderen Intl	5910va	7330eu	
1830	1900	s	Austria, AWR Europe	11865me		
1830	1900		Bulgaria, Radio	5800eu	7500eu	
1830	1900		Georgia, Radio Georgia	11910eu		
1830	1900		South Africa, AWR Africa	11985af		
1830	1900	mtwhfa	Sweden, Radio	6065va		
1830	1900		UK, RTE Radio	13640na	21630af	
1845	1900		Congo, RTV Congolaise	4765af	5985af	

1900 UTC - 2PM EST / 1PM CST / 11AM PST

1900	1915		Congo, RTV Congolaise	4765af	5985af	
1900	1915		Germany, Bible Voice Broadcasting	7295af		
1900	1915	smtwhf	Germany, Bible Voice Broadcasting	6015eu		
1900	1915	a fa	Germany, Bible Voice Broadcasting	9470me		
1900	1927		Vietnam, Voice of	7280eu	9730eu	
1900	1930	s	Germany, Universal Life	7105me		
1900	1930	s	Greece, Voice of	7475eu	9420eu	15630eu
			17705na			
1900	1930		Philippines, Radio Pilipinas	11730me	11890me	
			15190me			
1900	1945		India, All India Radio	7410eu	9445af	9950eu
			11620eu	11935af	13605af	15075af
			15155af	17670af		
1900	1956		China, China Radio Intl	9440af	9585af	
1900	1956		North Korea, Voice of	4405as	7505eu	11335eu
			11710eu			
1900	2000		Anguilla, Caribbean Beacon	11775am		
1900	2000		Australia, HCJB	11765pa		
1900	2000		Australia, Radio	6080pa	7240va	9500as
			9580va	9815pa	11880va	
1900	2000		Australia, Voice Intl	11685as		
1900	2000	vl	Botswana, Radio	4820do	4830al	
1900	2000		Canada, CBC Northern Service	9625do		
1900	2000		Canada, CFRX Toronto ON	6070do		
1900	2000		Canada, CFVP Calgary AB	6030do		
1900	2000		Canada, CKZN St John's NF	6160do		
1900	2000		Canada, CKZU Vancouver BC	6160do		
1900	2000		Costa Rica, University Network	5030am	6150am	
			7375am	9725sa	11870am	13750na
			17645as			
1900	2000		Eqt Guinea, Radio Africa	7189af	15184al	
1900	2000	1st a	Finland, Scandinavian Weekend Radio		5990eu	
			11690eu			
1900	2000		Germany, Deutsche Welle	6180af	11865af	
			13590af	13780af		
1900	2000	vl	Ghana, Ghana BC Corp	3366do	4915do	
1900	2000		Kuwait, Radio	11990va		
1900	2000		Latvia, Laser Radio	9290eu		
1900	2000		Liberia, ELWA	4760do		
1900	2000		Malaysia, RTM Radio 4	7295do		
1900	2000		Namibia, Namibian BC Corp	3270af	3290af	
			6060af			
1900	2000		Netherlands, Radio	7120af	9895af	11655af
			17810af			
1900	2000	as	Netherlands, Radio	15315na	17725na	17875na
1900	2000		New Zealand, Radio NZ Intl	15265pa		
1900	2000		Nigeria, Radio/Enugu	6025do		
1900	2000		Nigeria, Radio/Ibadan	6050do		
1900	2000		Nigeria, Radio/Kaduna	4770do	6090do	
1900	2000		Nigeria, Radio/Lagos	3326do	4990do	
1900	2000		Nigeria, Voice of	15120af	17800al	
1900	2000		Russia, Voice of	6175eu	6235eu	7335af
			7360eu	7290eu	11510af	
1900	2000		Sierra Leone, Radio UNAMSIL	6139af		
1900	2000		Sierra Leone, SLBS	3316do		
1900	2000	vl	Solomon Islands, SIBC	5020do	9545do	
1900	2000	m	South Africa, Amateur Radio League		3215af	
1900	2000		South Africa, Channel Africa	3345af		
1900	2000	m	South Africa, Radio League	3215af		
1900	2000		South Korea, Radio Korea Intl	5975om	7275eu	
1900	2000	a	Sri Lanka, SLBC	6010eu		
1900	2000		Swaziland, TWR	3200af		
1900	2000		Thailand, Radio	9535eu		
1900	2000		Uganda, Radio	4976do	5026do	7196do
1900	2000		UK, BBC World Service	3255af	6005af	
			6190af	6195eu	9410eu	9630af
			12095af	15310me	15400af	17830af
1900	2000		USA, Armed Forces Radio	4319usb	5446usb	
			5765usb	6350usb	7507usb	10320usb
			12133usb	12579usb	13362usb	13855usb
1900	2000		USA, KAIJ Dallas TX	13815va		
1900	2000		USA, KJES Vado NM	15385na		
1900	2000		USA, KTBN Salt Lake City UT	15590na		
1900	2000		USA, Voice of America	4950af	6035af	7415af
			9525va	9690va	9760va	9785va
			11870va	11975af	12015va	13640va
			13710af	15180va	15240af	15580af
			17895af			
1900	2000	s	USA, WBCQ Kennebunk ME	7415na		
1900	2000	mtwhfa	USA, WBCQ Kennebunk ME	9330na	17495na	
1900	2000		USA, WBOH Newport NC	5920am		
1900	2000		USA, WEWN Birmingham AL	13615na	17840af	
1900	2000		USA, WHRA Greenbush ME	17650af		
1900	2000		USA, WHRI Noblesville IN	9495am	13760va	
1900	2000		USA, WINB Red Lion PA	9930am		
1900	2000		USA, WJIE Louisville KY	13595am		
1900	2000	mtwhf	USA, WMLK Bethel PA	9465eu		
1900	2000		USA, WRMI Miami FL	15725na		
1900	2000	a	USA, WSHB Cypress Creek SC	15665eu		
1900	2000		USA, WSHB Cypress Creek SC	17505af		
1900	2000		USA, WTJC Newport NC	9370na		
1900	2000		USA, WWCR Nashville TN	9475na	12160na	
			13845na	15825na		
1900	2000	smtwhf	USA, WWRB Manchester TN	9320na	12172na	
1900	2000		USA, WYFR Okeechobee FL	3230af	15115af	
			15565eu	18980eu		
1900	2000	vl	Vanuatu, Radio	3945al	7260do	
1900	2000		Zambia, Radio Christian Voice	4965do		
1900	2000	vl	Zimbabwe, ZBC Corp	5975do		
1915	1925		Rwanda, Radio	6005do		
1915	1930	s t	Germany, Bible Voice Broadcasting	6015eu		
1915	1930	s fa	Germany, Bible Voice Broadcasting	7295af	9470me	
1915	1930		UK, BBC World Service	15105af	17885af	
1923	1930	vl	Libya, Voice of Africa	15105af	15315af	
1930	1945	mtwhf	Germany, Bible Voice Broadcasting	6015eu		
1930	1945	a	Germany, Bible Voice Broadcasting	7295af		
1930	2000		Georgia, Radio Georgia	11760eu		
1930	2000	mtwha	Germany, AWR Europe	11845eu		
1930	2000	s fa	Germany, Bible Voice Broadcasting	9470me		
1930	2000		Greece, Voice of	12105eu		
1930	2000	s	Greece, Voice of	7475eu	9420eu	15630eu
			17705na			
1930	2000		Iran, Voice of the Islamic Rep	6110eu	7215eu	
			7320eu	11695af	15140af	
1930	2000		Papua New Guinea, NBC	4890do	9675irr	
1930	2000		Serbia & Montenegro, Intl Radio	6100eu		
1930	2000		Slovakia, Radio Slovakia Intl	5915eu	6055eu	
			7345eu			
1930	2000		Switzerland, Swiss Radio Intl	9820va	11920va	
			13660va	17660va		
1930	2000		Turkey, Voice of	5980eu		
1935	1955		Italy, RAI Intl	5965eu	9755eu	
1940	1945		Turkmenistan, Turkmen Radio	4930as		
1945	2000	mtwhfa	Albania, Radio Tirana Intl	7210eu	9510eu	
1945	2000	a	Germany, Bible Voice Broadcasting	6015eu	7295af	

2000 UTC - 3PM EST / 2PM CST / 12PM PST

2000	2015	as	Germany, Bible Voice Broadcasting	9470me		
2000	2020		Turkey, Voice of	5980eu		
2000	2028		Hungary, Radio Budapest	3975eu	6025eu	
2000	2030	s	Germany, Bible Voice Broadcasting	6015eu		
2000	2030		Iran, Voice of the Islamic Rep	6110eu	7215eu	
			7320eu	11695af	15140af	
2000	2030		Israel, Kol Israel	9435va	11605va	13720va
			15640af			
2000	2030		Mongolia, Voice of	9720as		
2000	2030		Switzerland, Swiss Radio Intl	9820af	11920af	
			13660af	17660af		
2000	2030		Vatican City, Vatican Radio	7365af	9660af	
			11625af			
2000	2045		Swaziland, TWR	3200af		
2000	2045	mtwhfa	USA, WBCQ Kennebunk ME	9330na	17495na	
2000	2045	s	USA, WBCQ Kennebunk ME	7415na		
2000	2055		Netherlands, Radio	7120af	9895af	11655af
			17810af			
2000	2055	as	Netherlands, Radio	15315na	17725na	17875na
2000	2056		China, China Radio Intl	5965eu	9440af	
			9840eu	11640af	13630af	
2000	2059	mtwhf	Spain, Radio Exterior Espana	9595af	9680eu	
2000	2100		Anguilla, Caribbean Beacon	11775am		
2000	2100		Australia, ABC NT Alice Springs	2310do	4835irr	
2000	2100		Australia, ABC NT Katherine	2485do		
2000	2100		Australia, ABC NT Tennant Creek	2325do		
2000	2100	as	Australia, Radio	6080pa	7240va	
2000	2100		Australia, Radio	9500as	9580va	9815pa
			11880va	12080va		
2000	2100		Australia, Voice Intl	11685as		
2000	2100	vl	Botswana, Radio	4820do	4830al	
2000	2100		Canada, CBC Northern Service	9625do		
2000	2100		Canada, CFRX Toronto ON	6070do		
2000	2100		Canada, CFVP Calgary AB	6030do		
2000	2100		Canada, CKZN St John's NF	6160do		
2000	2100		Canada, CKZU Vancouver BC	6160do		
2000	2100		Costa Rica, University Network	5030am	6150am	
			7375am	9725sa	11870am	13750na
			17645as			
2000	2100		Eqt Guinea, Radio Africa	7189af	15184al	
2000	2100	1st a	Finland, Scandinavian Weekend Radio		5990eu	
			11690eu			
2000	2100		Germany, Deutsche Welle	13590af	13780af	
			15205af	15410af		
2000	2100	vl	Ghana, Ghana BC Corp	3366do	4915do	
2000	2100		Indonesia, Voice of	15150eu		
2000	2100	s	Ireland, Reflections Europe	3910eu	6295eu	
			12255eu			
2000	2100	vl	Italy, IRRS	5775va		
2000	2100		Kuwait, Radio	11990va		

2000	2100		Latvia, Laser Radio 9290eu		
2000	2100		Liberia, ELWA 4760do		
2000	2100		Malaysia, RTM Radio 4 7295do		
2000	2100	smtwh a	Malta, Voice of the Mediterranean 7440eu		
2000	2100		Namibia, Namibian BC Corp 3270af 3290af 6060af		
2000	2100		New Zealand, Radio NZ Intl 15265pa		
2000	2100		Nigeria, Radio/Enugu 6025do		
2000	2100		Nigeria, Radio/Ibadan 6050do		
2000	2100		Nigeria, Radio/Kaduna 4770do 6090do		
2000	2100		Nigeria, Radio/Lagos 3326do 4990do		
2000	2100		Nigeria, Voice of 17800af		
2000	2100		Papua New Guinea, NBC 4890do 9675irr		
2000	2100		Russia, Voice of 6145eu 6235eu 7290eu 7360eu		
2000	2100		Sierra Leone, Radio UNAMSIL 6139af		
2000	2100		Sierra Leone, SLBS 3316do		
2000	2100	vl	Solomon Islands, SIBC 5020do 9545do		
2000	2100		South Africa, AWR Africa 15295af		
2000	2100		South Africa, Channel Africa 3345af		
2000	2100		Syria, Radio Damascus 12085eu 13610eu		
2000	2100		Uganda, Radio 4976do 5026do 7196do		
2000	2100		UK, BBC World Service 3255af 6005af 6190af 6195eu 9410eu 9630af 12095af 15400af 17830af		
2000	2100		USA, Armed Forces Radio 4319usb 5446usb 5765usb 6350usb 7507usb 10320usb 12133usb 12579usb 13362usb 13855usb		
2000	2100		USA, KAIJ Dallas TX 13815va		
2000	2100		USA, KTBN Salt Lake City UT 15590na		
2000	2100		USA, Voice of America 4950af 6035af 6095va 7415af 9690va 7415af 9760va 11855af 11975af 13710af 15240af 15580af 17885af 17895af		
2000	2100		USA, WBOH Newport NC 5920am		
2000	2100		USA, WEWN Birmingham AL 13615na 17595af		
2000	2100		USA, WHRA Greenbush ME 17650as		
2000	2100		USA, WHRI Noblesville IN 5745va 9495am		
2000	2100		USA, WINB Red Lion PA 9930am		
2000	2100		USA, WJIE Louisville KY 13595am		
2000	2100	mtwhf	USA, WMLK Bethel PA 9465eu		
2000	2100		USA, WRMI Miami FL 15725na		
2000	2100	mwfs	USA, WSHB Cypress Creek SC 15665af		
2000	2100		USA, WTJC Newport NC 9370na		
2000	2100		USA, WWCR Nashville TN 9475na 12160na 13845na 15825na		
2000	2100	smtwhf	USA, WWRB Manchester TN 9320na 12172na		
2000	2100		USA, WYFR Okeechobee FL 5810eu 7580eu 15565af 17575sa		
2000	2100	vl	Vanuatu, Radio 3945al 7260do		
2000	2100		Zambia, Radio Christian Voice 4965do		
2000	2100	vl	Zimbabwe, ZBC Corp 5975do		
2025	2045		Italy, RAI Intl 5985af 9515af 11880af		
2030	2045		Thailand, Radio 9535eu		
2030	2056		Romania, Radio Romania Intl 6110eu 7105eu		
2030	2057		Vietnam, Voice of 7280eu 9730eu		
2030	2059		Belgium, Radio Vlaanderen Intl 7330eu		
2030	2100	t h	Belarus, Radio Belarus Intl 7105eu 7210eu		
2030	2100		Cuba, Radio Havana 9505eu 11760eu		
2030	2100		Egypt, Radio Cairo 15375af		
2030	2100		Sweden, Radio 6065va 9400va		
2030	2100	as	USA, Voice of America 4950af		
2030	2100		Uzbekistan, Radio Tashkent Intl 5025eu 7185eu 11905eu		
2040	2100	mtwhfa	Armenia, Voice of 4810eu 9960eu		
2045	2100		India, All India Radio 7410eu 9445eu 9575au 9910au 9950eu 11620va 11715au		
2045	2100		USA, WBCQ Kennebunk ME 7415na		
2045	2100	mtwhfa	USA, WBCQ Kennebunk ME 5105na 9330na 17495na		
2050	2100		Vatican City, Vatican Radio 4005eu 5890eu 7250eu		
2050	2100	DRM	Vatican City, Vatican Radio 9800eu		

2100 UTC - 4PM EST / 3PM CST / 1PM PST

2100	2110		Vatican City, Vatican Radio 4005eu 5890eu 7250eu		
2100	2110	DRM	Vatican City, Vatican Radio 9800eu		
2100	2115		Egypt, Radio Cairo 15375af		
2100	2115	mtwhf	UK, BBC World Service 5975ca		
2100	2127		Czech Rep, Radio Prague Intl 5930eu 9430va		
2100	2130		Australia, ABC NT Katherine 2485do		
2100	2130		Australia, ABC NT Tennant Creek 2325do		
2100	2130		China, China Radio Intl 5965eu 9840eu 11640af 13630af		
2100	2130		Cuba, Radio Havana 9505na 11760eu		
2100	2130	vl	Italy, IRRS 5775va		
2100	2130	DRM	Netherlands, Radio 11730eu		
2100	2130	mtwhf	Nigeria, Radio Jakada Intl 7380af		
2100	2130	mtwhfa	USA, WBCQ Kennebunk ME 5105na 9330na 17495na		
2100	2156		North Korea, Voice of 4405as 7505eu 11335eu		
2100	2159		Canada, Radio Canada Intl 5850va 7235va 7425va 9770va 9805va 13650va		
2100	2200		Anguilla, Caribbean Beacon 11775am		
2100	2200		Australia, ABC NT Alice Springs 2310do 4835irr		
2100	2200		Australia, Radio 7240va 9500as 9580va 9660pa 11880va 12080va 17715va 21740va		
2100	2200		Australia, Voice Intl 9795as		
2100	2200		Austria, AWR Europe 9660af		
2100	2200	vl	Botswana, Radio 4820do 4830al		
2100	2200		Canada, CBC Northern Service 9625do		
2100	2200		Canada, CFRX Toronto ON 6070do		
2100	2200		Canada, CFVP Calgary AB 6030do		
2100	2200		Canada, CKZN St John's NF 6160do		
2100	2200		Canada, CKZU Vancouver BC 6160do		
2100	2200		Costa Rica, University Network 5030am 6150am 7375am 9725sa 11870am 13750na 17645as		
2100	2200		Eqt Guinea, Radio Africa 7189af 15184al		
2100	2200	1st f	Finland, Scandinavian Weekend Radio 5990eu 11720eu		
2100	2200		Germany, Deutsche Welle 9615af 13780af 15410af		
2100	2200	vl	Ghana, Ghana BC Corp 3366do 4915do		
2100	2200		Guyana, Voice of 5949do		
2100	2200		India, All India Radio 7410eu 9445eu 9575au 9910au 9950eu 11620va 11715au		
2100	2200	s	Ireland, Reflections Europe 3910eu 6295eu 12255eu		
2100	2200		Japan, Radio 6090eu 6180eu 11855af 11920va 17825na 21670as		
2100	2200		Latvia, Laser Radio 9290eu		
2100	2200		Liberia, ELWA 4760do		
2100	2200		Malaysia, RTM Radio 4 7295do		
2100	2200		Namibia, Namibian BC Corp 3270af 3290af 6060af		
2100	2200		New Zealand, Radio NZ Intl 15265pa		
2100	2200		Nigeria, Radio/Enugu 6025do		
2100	2200		Nigeria, Radio/Ibadan 6050do		
2100	2200		Nigeria, Radio/Kaduna 4770do 6090do		
2100	2200		Nigeria, Radio/Lagos 3326do 4990do		
2100	2200		Nigeria, Voice of 17800af		
2100	2200		Papua New Guinea, NBC 4890do 9675irr		
2100	2200		Russia, Voice of 6235eu 7290eu 7360eu		
2100	2200		Sierra Leone, Radio UNAMSIL 6139af		
2100	2200		Sierra Leone, SLBS 3316do		
2100	2200		South Africa, Channel Africa 3345af		
2100	2200		Syria, Radio Damascus 12085eu 13610eu		
2100	2200		UK, BBC World Service 3255af 3915as 5965as 5975ca 6005af 6110as 6190af 6195va 9410eu 9605af 12095sa 15400af		
2100	2200		USA, Armed Forces Radio 4319usb 5446usb 5765usb 6350usb 7507usb 10320usb 12133usb 12579usb 13362usb 13855usb		
2100	2200		USA, KAIJ Dallas TX 13815va		
2100	2200		USA, KTBN Salt Lake City UT 15590na		
2100	2200		USA, Voice of America 6035af 6040va 6095va 7415af 9595va 9670va 9760va 11870va 11975af 13710af 15185va 15240af 15580af 17735va 17820va 17895af		
2100	2200		USA, WBCQ Kennebunk ME 7415na 17495na		
2100	2200		USA, WBOH Newport NC 5920am		
2100	2200		USA, WEWN Birmingham AL 13615na 17595af		
2100	2200		USA, WHRA Greenbush ME 17650af		
2100	2200		USA, WHRI Noblesville IN 5745va 9495am		
2100	2200		USA, WINB Red Lion PA 9930am		
2100	2200		USA, WJIE Louisville KY 13595am		
2100	2200		USA, WRMI Miami FL 15725na		
2100	2200	asm	USA, WSHB Cypress Creek SC 11650eu		
2100	2200	f	USA, WSHB Cypress Creek SC 15665af		
2100	2200		USA, WTJC Newport NC 9370na		
2100	2200		USA, WWCR Nashville TN 9475na 12160na 13845na 15825na		
2100	2200	smtwhf	USA, WWRB Manchester TN 9320na 12172na		
2100	2200		USA, WYFR Okeechobee FL 5810eu 7580eu 11740na 15565af 17575sa		
2100	2200	vl	Vanuatu, Radio 3945al 7260do		
2100	2200		Zambia, Radio Christian Voice 4965do		
2100	2200	vl	Zimbabwe, ZBC Corp 5975do		
2115	2130	mtwhf	UK, BBC World Service 5975ca 11675ca 15390ca		
2115	2200		Egypt, Radio Cairo 9989eu 15375af		
2123	2130	vl	Libya, Voice of Africa 15105af 15315af		
2130	2155	DRM	Netherlands, Radio 9800na 11730na		
2130	2156		China, China Radio Intl 5965eu 9840eu		
2130	2200		Australia, ABC NT Katherine 5025do		
2130	2200		Australia, ABC NT Tennant Creek 4910do		
2130	2200	t h	Belarus, Radio Belarus Intl 7105eu 7210eu		
2130	2200		Guam, AWR/KSDA 11980as		
2130	2200	mt h a	Guam, AWR/KSDA 12010as		
2130	2200		Iran, Voice of the Islamic Rep 9780au 11740au		
2130	2200	f/vl	Italy, IRRS 5775va		
2130	2200		Turkey, Voice of 9525as		
2130	2200	f	UK, Wales Radio Intl 7110eu		
2130	2200	mtwhfa	USA, WBCQ Kennebunk ME 5105na 9330na 17495na		
2130	2200		Uzbekistan, Radio Tashkent Intl 5025eu 7185eu 11905eu		

2200 UTC - 5PM EST / 4PM CST / 2PM PST

2200	2220		Turkey, Voice of 9525as		
2200	2228		Hungary, Radio Budapest 6025eu 11965af		

2200	2229		Belgium, Radio Vlaanderen Intl	11730na	
2200	2230		Canada, Radio Canada Intl 9770va 12005va	5850va	6045va
2200	2230		India, All India Radio 7410eu 9910au 9950eu 11620va	9445eu	9575au 11715au
2200	2230		Iran, Voice of the Islamic Rep	9780au	11740au
2200	2230	s	Ireland, Reflections Europe 12255eu	3910eu	6295eu
2200	2230	twhfas/vl	Italy, IRRS 5775va		
2200	2230		Liberia, ELWA 4760do		
2200	2230		Serbia & Montenegro, Intl Radio	6100eu	
2200	2230		South Korea, Radio Korea Intl	3955eu	
2200	2230	mtwhf	USA, Voice of America 11975af 13710af	6035af	7415af 11655af
2200	2240		New Zealand, Radio NZ Intl	15265pa	
2200	2245		Egypt, Radio Cairo 9989eu		
2200	2256		China, China Radio Intl	7170eu	
2200	2256		Romania, Radio Romania Intl 9550na 11830na	5975eu	7250eu
2200	2300		Anguilla, Caribbean Beacon	6090am	
2200	2300		Australia, ABC NT Alice Springs	2310do	4835irr
2200	2300		Australia, ABC NT Katherine	5025do	
2200	2300		Australia, ABC NT Tennant Creek	4910do	
2200	2300		Australia, Radio 9660va 15230as 17715va 17795va	12080va	13620va 21740va
2200	2300		Australia, Voice Intl 9795as		
2200	2300	vl	Botswana, Radio 4820do	4830al	
2200	2300		Bulgaria, Radio 5800eu	7500eu	
2200	2300		Canada, CBC Northern Service	9625do	
2200	2300		Canada, CFRX Toronto ON	6070do	
2200	2300		Canada, CFVP Calgary AB	6030do	
2200	2300		Canada, CKZN St John's NF	6160do	
2200	2300		Canada, CKZU Vancouver BC	6160do	
2200	2300	DRM	Canada, Radio Canada Intl	9800eu	
2200	2300		Costa Rica, University Network 7375am 9725sa 11870am 13750na	5030am	6150am 17645as
2200	2300		Eqt Guinea, Radio Africa	7189af	15184al
2200	2300	1st f	Finland, Scandinavian Weekend Radio 11720eu		5980eu
2200	2300		Germany, Deutsche Welle	6180as	6225as
2200	2300	vl	Ghana, Ghana BC Corp	3366do	4915do
2200	2300		Guyana, Voice of 3291do	5949do	
2200	2300		Malaysia, RTM Radio 4	7295do	
2200	2300		Namibia, Namibian BC Corp 6060af	3270af	3290af
2200	2300		Netherlands, Radio 15530eu		
2200	2300		Nigeria, Radio/Enugu	6025do	
2200	2300		Nigeria, Radio/Ibadan	6050do	
2200	2300		Nigeria, Radio/Kaduna	4770do	6090do
2200	2300		Nigeria, Radio/Lagos	3326do	4990do
2200	2300		Nigeria, Voice of 17800af		
2200	2300		Papua New Guinea, NBC	4890do	9675irr
2200	2300		Sierra Leone, Radio UNAMSIL	6139af	
2200	2300		Sierra Leone, SLBS 3316do		
2200	2300	vl	Solomon Islands, SIBC	5020do	9545do
2200	2300	as	Spain, Radio Exterior Espana	9595af	9680eu
2200	2300		Taiwan, Radio Taiwan Intl	9355eu	
2200	2300		UK, BBC World Service 6195va 7105as 9605af 12095sa 15400af	5965as	5975ca 9740as 11955as
2200	2300		Ukraine, Radio Ukraine Intl	5840eu	
2200	2300		USA, Armed Forces Radio 5765usb 6350usb 7507usb 12579usb 13362usb	4319usb	5446usb 10320usb 12133usb 13855usb
2200	2300		USA, KAIJ Dallas TX 13815va		
2200	2300		USA, KTBN Salt Lake City UT	15590na	
2200	2300		USA, KWHR Naalehu HI	17510as	
2200	2300		USA, Voice of America 11760va 15185va 15290va 17820va	7215va	9705va 9890va 15305va 17735va
2200	2300	mtwhfa	USA, WBCQ Kennebunk ME 9330na 17495na	5105na	7415na
2200	2300		USA, WBOH Newport NC	5920am	
2200	2300		USA, WEWN Birmingham AL	9975na	17595af
2200	2300		USA, WHRA Greenbush ME	17650af	
2200	2300		USA, WHRI Noblesville IN	5745va	9495am
2200	2300		USA, WINB Red Lion PA	9930am	
2200	2300		USA, WJIE Louisville KY	13595am	
2200	2300		USA, WRMI Miami FL 15725na		
2200	2300	s	USA, WSHB Cypress Creek SC	7510eu	
2200	2300	ws	USA, WSHB Cypress Creek SC	15285sa	
2200	2300		USA, WTJC Newport NC	9370na	
2200	2300		USA, WWCR Nashville TN 12160na 13845na	7465na	9475na
2200	2300	smtwhf	USA, WWRB Manchester TN	9320na	12172na
2200	2300		USA, WYFR Okeechobee FL 21525af	7580eu	11740na
2200	2300	vl	Vanuatu, Radio 3945al	7260do	
2200	2300		Zambia, Radio Christian Voice	4965do	
2205	2230		Italy, RAI Intl 11895as		
2230	2257		Czech Rep, Radio Prague Intl	7345na	9435af
2230	2300	mtwhfa	Albania, Radio Tirana Intl	7130eu	9530eu
2230	2300	f/occasional	Italy, IRRS 5775va		
2230	2300		Sweden, Radio 6065va		
2240	2300		New Zealand, Radio NZ Intl	17675pa	
2245	2300		India, All India Radio 13605as	9705as	9950as 11620as

2300 UTC - 6PM EST / 5PM CST / 3PM PST

2300	0000		Anguilla, Caribbean Beacon	6090am	
2300	0000		Australia, ABC NT Alice Springs	2310do	4835irr
2300	0000		Australia, ABC NT Katherine	5025do	
2300	0000		Australia, ABC NT Tennant Creek	4910do	
2300	0000		Australia, Radio 9660pa 13620as 15230as 15415as 21740va	11695as	12080va 17715va 17795va
2300	0000		Australia, Voice Intl 13620as		
2300	0000	vl	Botswana, Radio 4820do	4830al	
2300	0000		Canada, CBC Northern Service	9625do	
2300	0000		Canada, CFRX Toronto ON	6070do	
2300	0000		Canada, CFVP Calgary AB	6030do	
2300	0000		Canada, CKZN St John's NF	6160do	
2300	0000		Canada, CKZU Vancouver BC	6160do	
2300	0000		Costa Rica, University Network 7375am 9725sa 11870am 13750na	5030am	6150am 17645as
2300	0000		Cuba, Radio Havana 9550am		
2300	0000		Egypt, Radio Cairo 11725na		
2300	0000	1st f	Finland, Scandinavian Weekend Radio 11690eu		5980eu
2300	0000		Germany, Deutsche Welle 12035as	7250as	9815as
2300	0000	DRM	Germany, Deutsche Welle	9800as	
2300	0000	vl	Ghana, Ghana BC Corp	3366do	4915do
2300	0000		Guyana, Voice of 3291do	5949do	
2300	0000		India, All India Radio 13605as	9705as	9950as 11620as
2300	0000		Malaysia, RTM Radio 4	7295do	
2300	0000		Namibia, Namibian BC Corp 6060af	3270af	3290af
2300	0000		New Zealand, Radio NZ Intl	17675pa	
2300	0000		Papua New Guinea, NBC	4890do	9675irr
2300	0000		Sierra Leone, Radio UNAMSIL	6139af	
2300	0000		Sierra Leone, SLBS 3316do		
2300	0000		Singapore, Mediacorp Radio	6150do	
2300	0000	vl	Solomon Islands, SIBC	5020do	9545do
2300	0000		UK, BBC World Service 6035as 6195va 9740as 12095sa 15280as	3915as	5965as 11945as 11955as
2300	0000		USA, Armed Forces Radio 5765usb 6350usb 7507usb 12579usb 13362usb	4319usb	5446usb 10320usb 12133usb 13855usb
2300	0000		USA, KAIJ Dallas TX 13815va		
2300	0000		USA, KTBN Salt Lake City UT	15590na	
2300	0000		USA, KWHR Naalehu HI	17510as	
2300	0000		USA, WBCQ Kennebunk ME 9330na	5105na	7415na
2300	0000		USA, WBOH Newport NC	5920am	
2300	0000		USA, WEWN Birmingham AL	9975na	17595af
2300	0000		USA, WHRA Greenbush ME	7580va	
2300	0000		USA, WHRI Noblesville IN	5745va	9495am
2300	0000		USA, WINB Red Lion PA	9320am	
2300	0000		USA, WJIE Louisville KY	13595am	
2300	0000		USA, WRMI Miami FL 15725na		
2300	0000	mtwhf	USA, WRMI Miami FL 15725na		
2300	0000	ws	USA, WSHB Cypress Creek SC	7510va	
2300	0000	s	USA, WSHB Cypress Creek SC	15285am	
2300	0000		USA, WTJC Newport NC	9370na	
2300	0000	as	USA, WWBS Macon GA	11910na	
2300	0000		USA, WWCR Nashville TN 9475na 13845na	5070na	7465na
2300	0000		USA, WWRB Manchester TN 6890na	5050na	5085na
2300	0000		USA, WYFR Okeechobee FL 11855sa 15170sa 15400sa	5985sa	11740na
2300	0000		USA, WYFR Okeechobee FL 15170af	5985ca	11855ca
2300	0000	vl	Vanuatu, Radio 3945al	7260do	
2300	0000		Zambia, Radio Christian Voice	4965do	
2300	2329		Canada, Radio Canada Intl 11865am	5960am	9590am
2300	2330		USA, Voice of America 11735va 15110va	6180va	7205va 9780va
2300	2330	w	USA, WBCQ Kennebunk ME	17495na	
2300	2350		Turkey, Voice of 6015va	9655va	
2300	2356		China, China Radio Intl 13680na	5990ca	6040na
2300	2356		Romania, Radio Romania Intl 15145au 15370au	11840au	11940au
2304	0000		USA, WYFR Okeechobee FL	15400sa	
2315	2330		Croatia, Voice of 7285sa		
2320	2330		Kyrghyz, Kyrghyz Radio	4010as	4795as
2330	0000		Canada, Radio Canada Intl	5960na	9590na
2330	0000		Lithuania, Radio Vilnius	9875na	
2330	0000		Switzerland, Swiss Radio Intl	9885sa	11660sa
2330	0000		USA, Voice of America 9620va 9780va 11735va 15110va 15205va	6180va	7130va 7205va 11805va 13640va
2330	2357		Czech Rep, Radio Prague Intl	5915na	7345na
2330	2357		Vietnam, Voice of 9840as	12020as	

0000 UTC / 7pm E / 4pm P - Page 45 Freqs

SUNDAY
0000 WBCQ(7415kHz.) .. The Real Amateur Radio Show
0005 R. Australia Keys to Music (Graham Abbott breaks down the barriers to enjoying classical music for non-musicians)
R. Canada Int. Quirks and Quarks (Bob McDonald with what's new and next in science)
R. New Zealand Int. At the Movies (Simon Morris with reviews and movie news)
0006 BBCWS(am) Pick of the World (the WS's most popular presenters play vignettes from their favorite programs over the past week)
R. Netherlands Wide Angle (in-depth analysis of one world event or issue)
0010 R. Japan Hello from Tokyo (listener letters, music and short features)
0025 R. Netherlands Insight (Rob Green casts a critical and humorous eye on the past week's headlines)
0030 R. Netherlands Amsterdam Forum (interactive discussion on current affairs and issues)
R. New Zealand Int. Bookmarks (books and book people in NZ)
WBCQ(7415 kHz.) . Fred Flintstone's Music Show
0045 BBCWS(am) Write On (listeners comment on BBC programs)

MONDAY-FRIDAY
0006 R. New Zealand Int. Wayne's Music (Wayne Mowat with an hour of tunes too good to be forgotten)

MONDAY
0000 WBCQ(7415kHz.) .. Le Show (Harry Shearer with a tour-de-force variety show)
0005 R. Canada Int. Global Village (Jowi Taylor fields reports and music from global venues)
0006 BBCWS(am) Documentaries (social, cultural & political features)
R. Netherlands Wide Angle (in-depth analysis of one world event or issue)
0010 R. Australia Awaye! (Aboriginal social, political, arts and culture program)
R. Japan Weekend Japanology (various aspects of Japan presented with interviews, music and discussions)
0030 R. Netherlands Vox Humana (Michele Ernsting, Dheera Sujan and David Swatling team to celebrate the "Human Voice" and its connection to the human heart)
0032 BBCWS(am) We've Been Here Before (new panel game which takes a humorous look at the past through the lens of the present)

TUESDAY-SATURDAY
0000 R. Netherlands Newsline (RN's flagship international current affairs program)
0005 BBCWS(am) Outlook (topical magazine of people, places and events)
0005 R. Canada Int. As It Happens (continues from Mon.-Fri. 2330)
0015 R. Japan 44 Minutes (daily current affairs magazine about Japan and Asia)
0033 VOA News Now .... Coast to Coast (daily magazine of life in the USA hosted by Dave Arlington)
0045 BBCWS(am) Off the Shelf (serialized readings of the best in contemporary & classical literature)

TUESDAY
0010 R. Australia The Science Show (Robyn Williams with one of the longest running programs on ABC Radio)
0030 R. Netherlands The Research File (a magazine emphasizing the relevance of science to all our lives)

WEDNESDAY
0010 R. Australia The National Interest (Terry Lane's round-up of the week's major issues)
0030 R. Netherlands EuroQuest (a magazine placing Europe in context)

THURSDAY
0000 WBCQ(7415kHz) ... Off the Hook (discussing computer and information technology issues)
0010 R. Australia Background Briefing (ABC Radio's award-winning agenda-setting, current affairs radio documentary program)
0030 R. Canada Int. Dispatches (a Canadian perspective on international news topics)
R. Netherlands The Weekly Documentary (award-winning sound essays and in-depth investigations)

FRIDAY
0000 WBCQ(7415kHz.) .. Uncle Ed's Musical Memories
0010 R. Australia Hindsight (Australian social history woven from the memories of those who were there)
0030 R. Netherlands Dutch Horizons (Bertine Krol chronicles life in Holland)

SATURDAY
0000 R. Australia The Business Report (a comprehensive weekly round-up of business news)
R. Netherlands A Good Life (refer to 0030 T)
WBCQ(7415kHz) ... The Lost Discs Radio Show (spinning obscure oldies)
0006 R. New Zealand Int. Digital Life - Simon Morton looks at technology issues.
0030 R. Australia Ockham's Razor (sharp opinions about scientific topics)
R. Netherlands A Good Life (Ginger da Silva explores how development affects societies)
R. New Zealand Int. The Saturday Comedy Zone
0045 R. Australia Lingua Franca (a weekly program looking at all aspects of language)

0100 UTC / 8pm E / 5pm P - Page 45 Freqs

SUNDAY
0100 WBCQ(7415kHz) ... A Different Kind of Oldies Show (a unique mix of oldies music with "Big Steve" Cole)
0105 R. Australia Correspondents Report (ABC overseas reporters give their interpretation & analysis of the week's major events)
R. Prague Insight Central Europe (regional current affairs magazine produced jointly by eastern European broadcasters)
0106 BBCWS(am) Top of the Pops (music from the British pop & rock charts)
R. Netherlands Europe Unzipped (a 'zippy' compilation of news and views from Europe)
0120 China R. Int. In the Spotlight (Chinese arts and cultural magazine)
0125 R. Netherlands Insight (refer to 0025 S)
0130 R. Netherlands Amsterdam Forum (refer to 0030 S)
0135 R. New Zealand Int. The Band Programme (brass band music with John Harrison)
0140 R. Habana Cuba ... DXers Unlimited (Arnie Coro presents a program from radio enthusiasts)

MONDAY-FRIDAY
0105 R. New Zealand Int. In Touch with NZ (an afternoon of people & places, information & entertainment with Wayne Mowat)
0110 R. Australia Asia-Pacific (current affairs and business report about Asia and the Pacific)

MONDAY
0100 R. Habana Cuba ... Weekly Review (Cuba's perspective on current events)
WBCQ(7415kHz.) .. Radio New York International (Johnny Lightning plays classic rock to 0500)
0106 BBCWS(am) Everywoman (international women's magazine)
R. Netherlands Wide Angle (refer to 0006 M)
0115 R. Prague Czech Books (fortnightly) or Encore (Czech classical music)(monthly) Magic Carpet (world music from Prague)(monthly)
0130 BBCWS(am) Westway Omnibus (both of last week's episodes of this continuing drama)
China R. Int. People in the Know (interviews with prominent Chinese who are shaping the nation's future)
R. Australia The Health Report (Dr. Norman Swan's weekly report on health and medical issues)
R. Netherlands Vox Humana (refer to 0030 M)

TUESDAY-SATURDAY
0100 R. Netherlands Newsline (RN's flagship international current affairs program)

TUESDAY
0106 BBCWS(am) Documentaries (social, cultural & political features)
0130 China R. Int. Biz China (business and finance in the Chinese market)
R. Australia The Law Report (Damien Carrick presents breaking legal stories in Australia and overseas)
R. Netherlands Research File (refer to 0030 T)
0132 BBCWS(am) The Music Feature (documentaries giving insight into current popular music genres)
0144 VOA News Now .... Dateline (an 11-minute weekday documentary that examines a major issue unfolding in America or the world)

WEDNESDAY
0100 WBCQ(7415kHz) ... Allan Weiner Worldwide (the station manager's show)
0106 BBCWS(am) Masterpiece (critical examinations of creative ideas & endeavors)
0130 R. Australia The Religion Report (Stephen Crittenden examines the way religion and societies interact)
R. Netherlands EuroQuest (refer to 0030 W)
0132 BBCWS(am) White Label (a preview of tomorrow's popular music classics)
0140 R. Habana Cuba ... DXers Unlimited (Arnie Coro presents a program from radio enthusiasts)
0144 VOA News Now .... Dateline (refer to 0144 T)

THURSDAY
0106 BBCWS(am) Documentaries (social, cultural & political features)
0130 R. Australia The Media Report (Mick O'Regan takes a critical look at the latest developments in the communications industry)
R. Netherlands The Weekly Documentary (refer to 0030 H)
0132 BBCWS(am) Charlie Gillett (world music)
0144 VOA News Now .... Dateline (refer to 0144 T)

FRIDAY
0106 BBCWS(am) White in Africa (parts 3-5 of Robin White's series reflecting on changes in Africa over the last 30 years)
0130 China R. Int. Life in China (a weekly magazine focusing on the lives of ordinary people in China)
R. Australia The Sports Factor (Warwick Hadfield presents reports which debate and celebrate the cultural significance of sport)
R. Netherlands Dutch Horizons (refer to 0030 F)
0132 BBCWS(am) The Music Biz (the global music business examined)
0144 VOA News Now .... Dateline (refer to 0144 T)

SATURDAY
0100 WBCQ(7415kHz) ... Allan Weiner Worldwide (the station manager's show)
0105 R. Australia Asia Pacific Weekend Edition (a weekly current events and business report for and about Asia and the Pacific region)
R. New Zealand Int. Eureka! (Allan Coukell reports on science in NZ)
0106 BBCWS(am) Sports International (the issues & personalities behind the headlines)
0130 China R. Int. Listeners' Garden (letters, touring, cooking and a language lesson)
R. Netherlands A Good Life (refer to 0030 A)
R. New Zealand Int. Health Matters (health issues and developments with Louise Wallace)
0132 BBCWS(am) John Peel (innovative & eclectic music)
0133 VOA News Now .... News Review (VOA

correspondents in the field and from VOA language services join Neal Lavon to discuss the week's major events)

0200 UTC / 9pm E / 6pm P - Page 46 Freqs

SUNDAY

0200 WBCQ(7415kHz.) .. Marion's Attic (rare and vintage recordings presented by Marion Webster)
0201 BBCWS(am) Play of the Week (classic & contemporary radio theatrical productions)
0205 R. Australia Margaret Throsby (a guest is interviewed and presents favorite musical pieces)
R. Austria Int. Insight Central Europe (regional current affairs magazine produced jointly by eastern European broadcasters)(repeated at 0235)
R. New Zealand Int. Sunday Drama (classic and contemporary radio drama from around the world)
0210 R. Canada Int. Business Sense (an in-depth look at Canadian companies in the global economy)
R. Korea Int. Worldwide Friendship (listener letters, variety, DX news)
0211 Voice of Russia Moscow Mailbag (VOR's top-rated program in which Joe Adamov answers listener questions and talks about the latest rumors and jokes sweeping Moscow)
0230 R. Sweden Weekend (a magazine about Europe from the Radio E consortium, first week) Sweden Today (George Wood presents the voices of Sweden, second week) Spectrum (Bill Schiller covers the Swedish cultural scene, third week) Studio 49 (conversations on ideas and long-term trends in Sweden and the Nordic region, fourth week)
0232 Voice of Russia Moscow Yesterday and Today (recalling the most interesting events in the history of the city)
0235 R. Canada Int. Sci-Tech File (developments in science & technology in Canada and around the world)

MONDAY-FRIDAY

0205 R. New Zealand Int. In Touch with New Zealand (continues from 0105)
0210 R. Australia The World Today (a comprehensive current affairs program with Monica Attard and John Highfield)

MONDAY

0200 WBCQ(7415kHz.) .. Radio New York International (continues from 0100)
0205 R. Budapest Spotlight (a monthly magazine)(1st M) Europe Unlimited (Hungary's relations with the rest of Europe)(2nd M) Heading for Hungary (a monthly travelogue)(3rd M) And the Gatepost (listener letters)(4th M)
R. Austria Int. Insight Central Europe (regional current affairs magazine produced jointly by eastern European broadcasters)(repeated at 0235)
0206 BBCWS(am) The Ticket (interviews, live performances, reports & reviews from the arts around the globe)
0210 R. Canada Int. The Maple Leaf Mailbag (Ian Jones answers listener mail and hosts the fortnightly CIDX Report for dxers)
R. Habana Cuba ... From Havana (a showcase of contemporary Cuban music and musicians)
R. Korea Int. Korean Pop Interactive (a pop music request & dedication show)
0215 R. Prague Czech Books (fortnightly) or Encore (Czech classical music)(monthly) Magic Carpet (world music from Prague)(monthly) R. Taiwan Int. Jade Bells and Bamboo Pipes (Carson Wong introduces selections of traditional Chinese music)
0230 R. Habana Cuba ... Top Tens (Cuba's most popular music) or The Jazz Place (the very best of Cuban jazz)
R. Sweden In Touch with Stockholm (an interactive listener contact program presented the first weekend of each month by Nidia Hagström)
Sounds Nordic (R. Sweden's youth music and trends magazine, presented by Gaby Katz every weekend but the first)
0232 Voice of Russia Timelines (Estelle Winters' variety show giving insight into life in Moscow through foreign eyes)
0235 R. Canada Int. Spotlight (a magazine touching on all facets of artistic and cultural life in Canada)

TUESDAY-SATURDAY

0210 R. Budapest Hungary Today (daily magazine covering current events in Hungary)
R. Canada Int. Canada Today (daily magazine of interviews, correspondents' reports and Canadian views on world and national events)
0211 Voice of Russia Commonwealth Update (comments on domestic developments and major domestic issues)
0215 R. Austria Int. Report from Austria (a 15 min. daily magazine focusing on Austria and central and eastern Europe)(repeated at 0245)
R. Korea Int. Seoul Calling (daily magazine with perspectives from the Korean capital)
0230 R. Sweden Sixty Degrees North (reports, interviews and analysis on the Nordic region)

TUESDAY

0206 BBCWS(am) Health Matters (reports on the latest medical research)
0230 R. Korea Int. Korea Today & Tomorrow (examining peninsular relations)
0232 BBCWS(am) We've Been Here Before (new panel game which takes a humorous look at the past through the lens of the present)
Voice of Russia Folk Box (music drawn from the traditions of the hundreds of nationalities that make up Russia and the CIS)
0235 R. Canada Int. Media Zone (Ian Jones hosts a weekly forum with Canadian journalists discussing topical issues facing Canadians)
0245 R. Sweden Sports Scan (a weekly report on sports in the Nordic region)

WEDNESDAY

0206 BBCWS(am) Go Digital (technology journalist Tracey Logan explains the latest in IT)
0230 R. Korea Int. Korean Kaleidoscope (Korean life, societal aspects & issues)
0232 BBCWS(am) Music Review (news, views & personalities from the world of music)
Voice of Russia The Jazz Show (recordings from the Russian world of jazz)
0235 R. Canada Int. Spotlight (refer to 0235 M)
0245 R. Sweden Close Up (profiles of people in Sweden from all walks of life)

THURSDAY

0206 BBCWS(am) Discovery (in-depth exploration of science and technology topics)
0215 R. Taiwan Int. Discover Taiwan (exploring aspects of the island)
0230 R. Korea Int. Wonderful Korea (a radio travelogue)
0232 BBCWS(am) Westway (the week's first episode of this continuing drama)
0235 R. Canada Int. The Maple Leaf Mailbag (refer to 0210 M)
0245 BBCWS(am) Heart & Soul (how beliefs, values & religion influence lives)
R. Sweden Money Matters (a weekly economic report on the Nordic region)

FRIDAY

0206 BBCWS(am) One Planet (the environment, development, agriculture and human impact on the natural world)
0232 BBCWS(am) The Word (magazine about novels, theatre, poetry, journalism, biography, history & anthropology) World Book Club (last F only—Amy Tan discusses her novel "The Joy Luck Club"—e-mail your questions to worldbookclub@bbc.co.uk)
0235 R. Canada Int. Business Sense (refer to 0210 S)
0245 R. Sweden Nordic Report (a monthly magazine on Scandinavia produced by the broadcasters of the Nordic region and broadcast the first week) Greenscan (Azariah Kiros highlights Swedish environmental awareness and challenges the second week) Heart Beat (Gaby Katz hosts a monthly health and medical magazine, the third week) The S-Files (Kris Boswell takes you to the Sweden behind the headlines, the fourth week)

SATURDAY

0200 WBCQ(7415kHz) ... Tasha Takes Control (upbeat progressive music)
0205 R. Australia Background Briefing (refer to 0010 H)
0206 BBCWS(am) Science in Action (Richard Black reports on science and technology)
R. New Zealand Int. Home Grown (Liz Barry with a comprehensive range of NZ music, new releases and music industry info)
0230 R. New Zealand Int. Musical Chairs (NZ music artist profiles and performances)
0232 BBCWS(am) Westway (the week's second episode of this continuing drama)
0235 R. Canada Int. Sci-Tech File (refer to 0235 S)
0245 BBCWS(am) What's the Problem? (an expert team offers advice for problems presented by listeners)

0300 UTC / 10pm E / 7pm P - Page 46 Freqs

SUNDAY

0300 WWCR(5070kHz) ... DX Partyline (Allen Graham hosts HCJB's weekly program for DXers and SWLs)
0305 R. New Zealand Int. RPM (international documentary series)
0306 BBCWS(am) From Our Own Correspondent (BBC correspondents bring a personal perspective to their international postings)
0311 Voice of Russia News and Views (Russian views on news developments)
0320 China R. Int. In the Spotlight (Chinese arts and cultural magazine)
0330 R. Australia Jazz Notes (Australian performers & performances with Ivan Lloyd)
R. Sweden Weekend (a magazine about Europe from the Radio E consortium, on the first week) Sweden Today (George Wood presents the voices of Sweden, the second week) Spectrum (Bill Schiller covers the Swedish cultural scene, the third week) Studio 49 (conversations on ideas and long-term trends in Sweden and the Nordic region, the fourth week)
WWCR(5070kHz) ... World of Radio (Glenn Hauser's comprehensive review of the week in shortwave and international broadcasting)
0332 BBCWS(am) The Interview (ideas & trends shaping our world)
Voice of Russia Songs from Russia (melodies and musical novelties from Russia's past)
0340 R. Habana Cuba ... DXers Unlimited (Arnie Coro presents a program from radio enthusiasts)

MONDAY-FRIDAY

0300 BBCWS(am) The World Today (daily news & current events magazine)
R. New Zealand Int. Pacific Regional News
0308 R. New Zealand Int. Dateline Pacific (news from the Pacific with interviews & features with the region's newsmakers)
0320 R. Australia Life Matters (daily interview program about social change and day-to-day life in Australia)

MONDAY

0300 KWHR(17510kHz) ... DXing with Cumbre (Marie Lamb with the hottest DX catches)
R. Habana Cuba ... Weekly Review (Cuba's perspective on current events)
WBCQ(7415kHz) ... Radio New York International (continues from 0100)
0311 Voice of Russia Moscow Mailbag (refer to 0311 S)

0315 Radio Taipei Int. ..... Taiwan Economic Journal
0330 BBCWS(am) Assignment (documentaries that delve behind the headlines)
China R. Int. People in the Know (interviews with prominent Chinese who are shaping the nation's future)
R. New Zealand Int. New Music Releases
R. Sweden In Touch with Stockholm (an interactive listener contact program presented the first weekend of each month by Nidia Hagström) Sounds Nordic (R. Sweden's youth music and trends magazine, presented by Gaby Katz every weekend but the first)
0332 BBCWS(am) World Business Review (the past week in business)
Voice of Russia This is Russia (the cities and regions, culture and the arts, the countryside, religion and people)
0335 R. Budapest Spotlight (a monthly magazine)(1st M) Europe Unlimited (Hungary's relations with the rest of Europe)(2nd M) Heading for Hungary (a monthly travelogue)(3rd M) And the Gatepost (listener letters)(4th M)
0340 R. Habana Cuba ... The Mailbag Show (listener letters)
0345 BBCWS(am) The Instant Guide (background to current events)

TUESDAY-SATURDAY
0311 Voice of Russia News and Views (Russian views on news developments)
0330 R. Sweden Sixty Degrees North (reports, interviews and analysis on the Nordic region)
0332 BBCWS(am) World Business Report (a guide through the main business issues of the day)
0335 R. Budapest Hungary Today (a daily magazine covering current events in Hungary)

TUESDAY
0315 Radio Taipei Int. ..... Jade Bells and Bamboo Pipes (refer to 0215 M)
0330 China R. Int. Biz China (business and finance in the Chinese market)
R. New Zealand Int. Mailbox (listener letters & DX news with Myra Oh & Adrian Sainsbury) or RNZI Talk (news about the station)
0332 Voice of Russia Kaleidoscope (the latest economic, social and cultural events in Russia and the CIS)
0345 BBCWS(am) Analysis (background to the stories in the news)
R. Sweden Sports Scan (a weekly report on sports in the Nordic region)

WEDNESDAY
0330 R. New Zealand Int. Tradewinds (Walter Zweifel with a weekly report on Pacific regional business & economic news)
0340 R. Habana Cuba ... DXers Unlimited (Arnie Coro presents a program from radio enthusiasts)
0345 BBCWS(am) Analysis (background to the stories in the news)
R. Sweden Close Up (profiles of people in Sweden from all walks of life)

THURSDAY
0315 R. Taiwan Int. Taipei Magazine
0330 R. New Zealand Int. The World in Sport (Dmitri Edwards presents highlights of the world's sporting week with emphasis on NZ and the Pacific)
0332 Voice of Russia Moscow Yesterday and Today (refer to 0232 S)
0345 BBCWS(am) From Our Own Correspondent (the background to international events from BBC correspondents around the world)
R. Sweden Money Matters (a weekly economic report on the Nordic region)

FRIDAY
0330 China R. Int. Life in China (a weekly magazine focusing on the lives of ordinary people in China)
R. New Zealand Int. Pacific Correspondent (RNZI's regional correspondents talk to Don Wiseman about political and social issues in their respective Pacific countries)
R. Taiwan Int. Taiwan Gourmet
0345 BBCWS(am) Analysis (background to the stories in the news)
R. Sweden Nordic Report (a monthly magazine on Scandinavia produced by the broadcasters of the Nordic region and broadcast the first week) Greenscan (Azariah Kiros highlights Swedish environmental awareness and challenges the second week) Heart Beat (Gaby Katz hosts a monthly health and medical magazine, the third week) The S-Files (Kris Boswell takes you to the Sweden behind the headlines, the fourth week)

SATURDAY
0305 R. Australia Rural Reporter (ABC's rural reporters present news and stories from rural and regional Australia
R. New Zealand Int. Home Grown (continued from 0205 A)
0306 BBCWS(am) White in Africa (parts 3-5 of Robin White's series reflecting on changes in Africa over the last 30 years)
0311 Voice of Russia Newmarket (refer to 0311 W)
0330 China R. Int. Listeners' Garden (letters, touring, cooking and a language lesson)
R. Australia Australian Country Style (Australian country music with John Nutting)
0332 Voice of Russia Audio Book Club (readings from the best of Russian classic and contemporary literature)
0345 BBCWS(am) Analysis (background to the stories in the news)

0400 UTC / 11pm E / 8pm P - Page 47 Freqs

SUNDAY
0400 BBCWS(am) World Briefing
WWCR(5070kHz) ... Spectrum (talk about radio, computers & communications)
0405 R. Australia All in the Mind (the mental universe, the mind, the brain and human behavior)
0406 R. Netherlands Europe Unzipped (a 'zippy'compilation of news and views from Europe)
0410 R. New Zealand Int. Spiritual Outlook (or) Touchstone (religious discussion and debate)
0411 Voice of Russia Music & Musicians (classical music performances of Russian compositions by Russian artists)
0420 China R. Int. In the Spotlight (refer to 0320 S)
0425 R. Netherlands Insight (Rob Green casts a critical and humorous eye on the past week's headlines)
0430 KWHR(17780kHz) ... DXing with Cumbre (Marie Lamb with the hottest DX catches)
R. Netherlands Amsterdam Forum (interactive discussion on current affairs and issues)
0432 BBCWS(am) Global Business (Peter Day charts the transformations sweeping through the world of work and commerce)
0440 R. New Zealand Int. Jazz Spotlight (Haydn Sherley with an artist focus)

MONDAY-FRIDAY
0400 R. New Zealand Int. Checkpoint (RNZ National Radio's flagship domestic evening news program)
0410 R. Australia Margaret Throsby (a guest is interviewed and presents favorite musical pieces)

MONDAY
0400 WBCQ(7415kHz) ... Radio New York International (continues from 0100)
0405 R. Habana Cuba ... From Havana (a showcase of contemporary Cuban music and musicians)
0406 BBCWS(am) Talking Point (interactive discussion about the major events of the day)
R. Netherlands Wide Angle (in-depth analysis of one world event or issue)
0411 Voice of Russia Science and Engineering (reports on the latest developments in science and technology)
0415 R. Prague Czech Books (fortnightly) or Encore (Czech classical music)(monthly) Magic Carpet (world music from Prague)(monthly)
0430 China R. Int. People in the Know (refer to 0330 M)
R. Habana Cuba ... Top Tens (Cuba's most popular music) (1st/3rd wk.) ..... The Jazz Place (the very best of Cuban jazz)(2nd/4th wk.)
R. Netherlands Vox Humana (Michele Ernsting, Dheera Sujan and David Swatling team to celebrate the "Human Voice" and its connection to the human heart)
WHRI(7315kHz) DXing with Cumbre (Marie Lamb with the hottest DX catches)
0432 Voice of Russia Audio Book Club (refer to 0332 A)

TUESDAY-SATURDAY
0400 R. Netherlands Newsline (RN's flagship current affairs magazine)
0406 BBCWS(am) Outlook (topical magazine of people, places & events)
0445 BBCWS(am) Off the Shelf (abridged serialized readings of novels, stories and other literature)

TUESDAY
0430 China R. Int. Biz China (refer to 0330 T)
R. Netherlands The Research File (a magazine emphasizing the relevance of science to all our lives)

WEDNESDAY
0411 Voice of Russia Moscow Mailbag (refer to 0211 S)
0430 R. Netherlands EuroQuest (a magazine placing Europe in context)

THURSDAY
0411 Voice of Russia Science and Engineering (reports on the latest developments in science and technology)
0430 R. Netherlands The Weekly Documentary (award-winning sound essays and in-depth investigations)

FRIDAY
0411 Voice of Russia Newmarket (news about business in Russia and Russia's involvement in international business)
0430 China R. Int. Life in China (refer to 0330 F)
R. Netherlands Dutch Horizons (Bertine Krol chronicles life in Holland)

SATURDAY
0405 R. Australia The Music Show (a mix of music, interviews & information about the latest developments in music, hosted by composer Andrew Ford)
0406 BBCWS(am) Pick of the World
0410 R. New Zealand Int. Tagata o te Moana (Pacific news, features, interviews & music)
0411 Voice of Russia Moscow Mailbag (refer to 0211 S)
0430 China R. Int. Listeners' Garden (refer to 0330 A)
R. Netherlands A Good Life (Ginger da Silva explores how development affects societies)
0445 BBCWS(am) Write On (listeners critique the BBC & its programs)

0500 UTC / 12am E / 9pm P - Page 47 Freqs

DAILY
0500 BBCWS(am) World Briefing

SUNDAY
0500 RVi Belgium Music from Flanders (a half-hour of Flemish music, musicians and musical performances)
WBCQ(7415kHz) ... Tom and Darryl (discussions about satellite, shortwave, LPFM & Internet communications)
WWCR(5070kHz) ... Cyber Line (musings on the new technologies)
0505 R. Australia The Europeans (broader historical & cultural perspectives on European societies)

R. New Zealand Int. Mana Korero (Maori current affairs)
0510 R. Japan Pop Joins the World (a look at Asia as it is now, presenting the cultures & lifestyles of other Asian countries through their popular music)
0520 BBCWS(am) Sports Round-up
China R. Int. In the Spotlight (refer to 0320 S)
0530 R. Australia The Ark (moments in religious history that challenge the usual perceptions)
0532 BBCWS(am) Reporting Religion (Trevor Barnes reports on global religious and ethical issues)
Voice of Russia Kaleidoscope (the latest economic, social and cultural events in Russia and the CIS)
0540 R. Habana Cuba ... DXers Unlimited (Arnie Coro presents a program from radio enthusiasts)

MONDAY-FRIDAY
0500 WBCQ(7415kHz.) .. Amos 'n Andy (the classic radio comedy from America's radio past)
0506 R. New Zealand Int. Worldwatch and Pacific Report (a summary of international news, followed by news from the Pacific region)
0510 R. Australia Pacific Beat (a daily current events & features magazine focusing on the Pacific island nations)
0515 R. Japan 44 Minutes (current affairs magazine about Japan and Asia)
0532 BBCWS(am) The World Today (refer to 0300 M-F)
0545 R. New Zealand Int. Storytime (stories for children & the young at heart)

MONDAY
0500 R. Habana Cuba ... Weekly Review (Cuba's perspective on current events)
RVi Belgium Radio World (Frans Vossen presents a weekly report about international radio)
0530 China R. Int. People in the Know (refer to 0330 M)
0532 Voice of Russia The Jazz Show (recordings from the Russian world of jazz)
0540 R. Habana Cuba ... The Mailbag Show (listener letters)
0545 WBCQ World of Radio (Glenn Hauser's comprehensive review of the week in shortwave and international broadcasting)

TUESDAY-SATURDAY
0500 RVi Belgium Flanders Today (news, views & music from Flanders and Belgium)

TUESDAY
0511 Voice of Russia Moscow Mailbag (VOR's top-rated program in which Joe Adamov answers listener questions and talks about the latest rumors and jokes sweeping Moscow)
0530 China R. Int. Biz China (refer to 0330 T)

WEDNESDAY
0511 Voice of Russia Science and Engineering (reports on the latest developments in science and technology)
0532 Voice of Russia Moscow Yesterday and Today (recalling the most interesting events in the history of the city)
0540 R. Habana Cuba ... DXers Unlimited (Arnie Coro presents a program for radio enthusiasts.)

THURSDAY
0511 Voice of Russia Newmarket (news about business in Russia and Russia's involvement in international business)
0532 Voice of Russia Folk Box (music drawn from the traditions of the hundreds of nationalities that make up Russia and the CIS)

FRIDAY
0511 Voice of Russia Moscow Mailbag (refer to 0211 S)
0530 China R. Int. Life in China (refer to 0330 F)
0532 Voice of Russia Audio Book Club (refer to 0332 A)

SATURDAY
0500 WBCQ(7415kHz.) .. Amos 'n Andy (the classic radio comedy from America's radio past)
0505 R. Australia The Music Show (continued from 0405)
0507 R. New Zealand Int. The Mix (new music, interviews and sessions with rock, dance, hip-hop and pop musicians)
0510 R. Japan Hello from Tokyo (listener letters, music and short features)
0511 Voice of Russia Science and Engineering (refer to 0511 W)
0530 China R. Int. Listeners' Garden (refer to 0330 A)
0532 BBCWS(am) People & Politics (insight into & analysis of British politics)
Voice of Russia Timelines (refer to 0232 M)

1100 UTC / 6am E / 3am P - Page 50 Freqs

DAILY
1100 BBCWS(am) World Briefing
1120 BBCWS(am) British News

SUNDAY
1100 R. New Zealand Int. NZ Forces Programme (news, information & entertainment for NZ troops & personnel stationed in East Timor & Papua-New Guinea)
1105 R. Australia Correspondents Report (The ABC's overseas reporters give their interpretation and analysis of the week's major events)
1110 R. Japan Hello from Tokyo (listener letters, music and short features)
1130 R. Australia The Arts on RA (Julie Copeland with Australian arts and cultural events)
1132 BBCWS(am) The Instant Guide (refer to 0345 M)
1145 BBCWS(am) Sports Roundup

MONDAY-FRIDAY
1100 R. New Zealand Int. Pacific Regional News
1105 BBCWS(am) Caribbean Report (the latest news in the Caribbean)
R. Australia Asia-Pacific (Radio Australia's flagship current events and business report for and about Asia and the Pacific region)
1108 R. New Zealand Int. Dateline Pacific (refer to 0308 M-F)
1110 BBCWS(am) Sports Caribbean
1115 BBCWS(am) Caribbean Magazine (a current affairs and feature program focusing on life in the region)
R. Japan Asian Top News (the day's major stories as reported by the region's radio stations)
1130 R. Australia Bush Telegraph (a daily magazine highlighting regional and rural issues)
1132 BBCWS(am) World Business Report (the main business issues of the day)

MONDAY
1125 R. Japan Japan Music Treasure Box
1130 R. New Zealand Int. Mailbox or RNZI Talk (refer to 0330 T)
1145 BBCWS(am) Sports Round-up (all the daily sporting news worldwide)

TUESDAY
1130 R. New Zealand Int. Tradewinds (refer to 0330 W)
1145 BBCWS(am) Sports Round-up (all the daily sporting news worldwide)

WEDNESDAY
1125 R. Japan Japanese Musicscape (songs rooted in the lifestyles of each region of Japan, introducing the local traditions, history and culture)
1130 R. New Zealand Int. The World in Sport (refer to 0330 H)
1145 BBCWS(am) Sports Round-up (all the daily sporting news worldwide)

THURSDAY
1130 R. New Zealand Int. Pacific Correspondent (refer to 0330 F)
1145 BBCWS(am) Sports Round-up (all the daily sporting news worldwide)

FRIDAY
1125 R. Japan Music Beat (contemporary Japanese popular music)
1130 R. New Zealand Int. Sports Story (sports anthology program)
1145 BBCWS(am) Football Extra (global soccer news, reviews and interviews)

SATURDAY
1100 R. New Zealand Int. NZ Forces Programme (refer to 1100 S)
1105 R. Australia Asia Pacific Weekend Edition (a weekly current events and business report for and about Asia and the Pacific region)
1110 R. Japan Pop Joins the World (a look at Asia as it is now, presenting the cultures and lifestyles of other Asian countries through their popular music)
1130 R. Australia The Europeans (broader historical and cultural perspectives on European societies)
1132 BBCWS(am) World Football (Alan Green with a report on soccer around the world)

1200 UTC / 7am E / 4am P - Page 50 Freqs

DAILY
1200 BBCWS(am) Newshour (60 minutes of news and analysis from around the globe)

SUNDAY
1205 R. Australia The Spirit of Things (Dr. Rachael Kohn explores contemporary values and beliefs as expressed through ritual, art, music, and sacred texts)
R. New Zealand Int. Sportsworld (excerpts & summaries of the weekend's sporting events)
1206 R. Netherlands Wide Angle (refer to 0406 M)
1230 R. Netherlands Vox Humana ..... (refer to 0430 M)
R. Sweden In Touch with Stockholm (an interactive listener contact program presented the first weekend by Nidia Hagström) Sounds Nordic (R. Sweden's youth music and trends magazine, presented by Gaby Katz every weekend but the first)

MONDAY-FRIDAY
1200 R. Netherlands Newsline (RN's flagship current affairs magazine)
R. New Zealand Int. Late Edition (RNZ National Radio's domestic late evening news magazine)
1205 BBCWS(am) Caribbean Business (a report on regional commerce and economics)
1210 BBCWS(am) Caribbean Report (the latest news in the Caribbean)
1230 R. Sweden Sixty Degrees North (reports, interviews and analysis on the Nordic region)

MONDAY
1205 R. Australia Late Night Live (Philip Adams interviews the major newsmakers, philosophers, artists and trendsetters in Australia & around the world)
1230 R. Netherlands The Research File (refer to 0430 T)
1245 R. Sweden Sports Scan (a weekly report on sports in the Nordic region)

TUESDAY
1205 R. Australia Late Night Live (refer to 1205 M)
1230 R. Netherlands EuroQuest (refer to 0430 W)
1245 R. Sweden Close Up (profiles of people in Sweden from all walks of life)

WEDNESDAY
1205 R. Australia Late Night Live (refer to 1205 M)
1230 R. Netherlands The Weekly Documentary (refer to 0430 H)
1245 R. Sweden Money Matters (a weekly economic report on the Nordic region)

THURSDAY
1205 R. Australia Late Night Live (refer to 1205 M)
1230 R. Netherlands Dutch Horizons (refer to 0430 F)

1245 R. Sweden Nordic Report (a monthly magazine on Scandinavia produced by the broadcasters of the Nordic region and broadcast the first week) Greenscan (Azariah Kiros highlights Swedish environmental awareness and challenges the second week) Heart Beat (Gaby Katz hosts a monthly health and medical magazine, the third week) The S-Files (Kris Boswell takes you to the Sweden behind the headlines, the fourth week)

FRIDAY
1200 R. Netherlands The Weekly Documentary (refer to 1230 W)
1205 R. Australia Sound Quality (Tim Ritchie seeks out the interesting, the evolutionary, the inaccessible & the wonderful in music)
1230 R. Netherlands A Good Life (refer to 0430 A)
1245 R. Sweden A Report on the Nordic Newsweek (the week's main news stories)

SATURDAY
1200 HCJB Ecuador DX Partyline (Allen Graham hosts HCJB's weekly program for DXers and SWLs)
R. New Zealand Int. NZ Forces Programme (continues from 1100)
1205 R. Australia The Music Show (refer to 0405 A)
WWCR(5070kHz) ... Rock the Universe (Christian rock music)
1206 R. Netherlands Europe Unzipped (refer to 0406 S)
1225 R. Netherlands Insight (refer to 0425 S)
1230 R. Netherlands Amsterdam Forum (refer to 0430 S)
R. Sweden Weekend (a magazine about Europe from the Radio E consortium, on the first week) Sweden Today (George Wood presents the voices of Sweden, the second week) Spectrum (Bill Schiller covers the Swedish cultural scene, the third week) Studio 49 (conversations on ideas and long-term trends in Sweden and the Nordic region, the fourth week)

1300 UTC / 8am E / 5am P - Page 51 Freqs

SUNDAY
1305 R. Australia Encounter (the religious experience of multicultural Australia)
1306 BBCWS(am) Documentaries (social, cultural & political features)
R. New Zealand Int. Wayne's Music (refer to 0005 M-F)
1320 China R. Int. In the Spotlight (Chinese arts and cultural magazine)
1330 R. Sweden In Touch with Stockholm (an interactive listener contact program presented the first weekend of each month by Nidia Hagström) Sounds Nordic (R. Sweden's youth music and trends magazine, presented by Gaby Katz every weekend but the first)
1332 BBCWS(am) In Praise of God (diverse services of worship)

MONDAY-FRIDAY
1300 R. New Zealand Int. Pacific Regional News
1305 R. Australia The Planet (Lucky Oceans with a rich mix of jazz, blues, folk styles, art music & more in a show artfully arranged for radio)
1306 BBCWS(am) Outlook (topical magazine of people, places and events)
1308 R. New Zealand Int. Dateline Pacific (refer to 0308 M-F)
1310 R. Canada Int. The Current (Anna Maria Tremonti hosts a CBC domestic daily current affairs magazine)(joined in progress)
1330 R. Sweden Sixty Degrees North (reports, interviews and analysis on the Nordic region)
1345 BBCWS(am) Off the Shelf (abridged serialized readings of novels, stories and other literature)

MONDAY
1330 China R. Int. People in the Know (interviews with prominent Chinese who are shaping the nation's future)
R. New Zealand Int. Mailbox or RNZI Talk (refer to 0330 T)
1345 R. Sweden Sports Scan (a weekly report on sports in the Nordic region)

TUESDAY
1330 China R. Int. Biz China (business and finance in the Chinese market)
R. New Zealand Int. Tradewinds (refer to 0330 W)
1345 R. Sweden Close Up (profiles of people in Sweden from all walks of life)

WEDNESDAY
1330 R. New Zealand Int. The World in Sport (refer to 0330 H)
1345 R. Sweden Money Matters (a weekly economic report on the Nordic region)

THURSDAY
1330 R. New Zealand Int. Pacific Correspondent (refer to 0330 F)
1345 R. Sweden Nordic Report (a monthly magazine on Scandinavia produced by the broadcasters of the Nordic region and broadcast the first week) Greenscan (Azariah Kiros highlights Swedish environmental awareness and challenges the second week) Heart Beat (Gaby Katz hosts a monthly health and medical magazine, the third week) The S-Files (Kris Boswell takes you to the Sweden behind the headlines, the fourth week)

FRIDAY
1330 China R. Int. Life in China (a weekly magazine focusing on the lives of ordinary people in China)
R. New Zealand Int. Sports Story (refer to 1130 F)
1345 R. Sweden A Report on the Nordic Newsweek (the week's main news stories)

SATURDAY
1305 R. Australia The Music Show (continued from 1205)
R. New Zealand Int. Touchstone or Spiritual Outlook (refet to 0410 S)
1306 BBCWS(am) Pick of the World
1320 R. New Zealand Int. Hymns
1330 China R. Int. Listeners' Garden (letters, touring, cooking and a language lesson)
R. Sweden Weekend (a magazine about Europe from the Radio E consortium, on the first week) Sweden Today (George Wood presents the voices of Sweden, the second week) Spectrum (Bill Schiller covers the Swedish cultural scene, the third week) Studio 49 (conversations on ideas and long-term trends in Sweden and the Nordic region, the fourth week)
WHRI(9495kHz.) ..... DXing with Cumbre (Marie Lamb with the hottest DX catches)
1345 BBCWS(am) Write On (listeners critque the BBC & its programs)

1400 UTC / 9am E / 6am P - Page 51 Freqs

DAILY
1400 R. Japan News (a round-up of Asian and world news)

SUNDAY
1400 WRMI(15725kHz) ... Wavescan (a weekly program from Adventist World Radio for DXers and shortwave radio enthusiasts)
WWCR(15825kHz) .. The Golden Age of Radio (classic American radio shows)
1405 R. Australia The Science Show (Robyn Williams presents one of the longest running programs on ABC Radio)
1406 BBCWS(am) Talking Point (global phone-in where listeners and internet users can share their views on the issues of the day and put questions to expert guests)
1410 R. Canada Int. The Sunday Edition (a relaxed and reflective weekend current affairs, arts and ideas magazine hosted by Michael Enright)
R. Japan Pop Joins the World (a look at Asia as it is now, presenting the cultures and lifestyles of other Asian countries through their popular music)
1415 R. Prague Czech Books (fortnightly) or Encore (Czech classical music)(monthly) Magic Carpet (world music from Prague)(monthly)
1420 China R. Int. In the Spotlight (refer to 1320 S)
1430 R. Sweden In Touch with Stockholm (an interactive listener contact program presented the first weekend of each month by Nidia Hagström) Sounds Nordic (R. Sweden's youth music and trends magazine, presented by Gaby Katz every weekend but the first)

MONDAY-FRIDAY
1400 WWCR(15825kHz) .. World Wide Country Radio (country music)
1405 R. Australia PM (ABC Radio's comprehensive late afternoon current affairs program)
R. Canada Int. Sounds Like Canada (Shelagh Rogers hosts a lively mix of voices and sound from all over the country)
1415 R. Japan 44 Minutes (current affairs magazine about Japan and Asia)
1430 R. Sweden Sixty Degrees North (reports, interviews and analysis on the Nordic region)

MONDAY
1406 BBCWS(am) Documentary (refer to 0106 T)
1430 China R. Int. People in the Know (refer to 1330 M)
1432 BBCWS(am) The Music Feature (refer to 0132 T)
1445 R. Sweden Sports Scan (a weekly report on sports in the Nordic region)

TUESDAY
1406 BBCWS(am) Masterpiece (refer to 0106 W)
1430 China R. Int. Biz China (refer to 1330 T)
1432 BBCWS(am) White Label (refer to 0132 W)
1445 R. Sweden Close Up (profiles of people in Sweden from all walks of life)

WEDNESDAY
1406 BBCWS(am) Documentary (refer to 0106 H)
1432 BBCWS(am) Charlie Gillett (world music)
1445 R. Sweden Money Matters (a weekly economic report on the Nordic region)

THURSDAY
1406 BBCWS(am) White In Africa (refer to 0106 F)
1432 BBCWS(am) The Music Biz (the global music business examined)
1445 R. Sweden Nordic Report (a monthly magazine on Scandinavia produced by the broadcasters of the Nordic region and broadcast the first week) Greenscan (Azariah Kiros highlights Swedish environmental awareness and challenges the second week) Heart Beat (Gaby Katz hosts a monthly health and medical magazine, the third week) The S-Files (Kris Boswell takes you to the Sweden behind the headlines, the fourth week)

FRIDAY
1406 BBCWS(am) Sports International (refer to 0106 A)
1430 China R. Int. Life in China (refer to 1330 F)
1432 BBCWS(am) John Peel (innovative and eclectic music)
1445 R. Sweden A Report on the Nordic Newsweek (the week's main news stories)

SATURDAY
1405 R. Australia Background Briefing (ABC Radio's award-winning agenda-setting, current affairs radio documentary program)
R. Prague Insight Central Europe (regional current affairs produced jointly by eastern European broadcasters)
1406 BBCWS(am) Sportsworld (live commentary on major sports events and fixtures, reports and results from around Britain and Europe, and news of all the day's sporting action from

around the world)
1410 R. Canada Int. The House (a review of the week in Canadian national politics)
R. Japan Weekend Japanology (a program designed to present various aspects of Japan in a friendly and relaxed atmosphere with interviews, music and discussions)
1430 China R. Int. Listeners' Garden (refer to 1330 A)
R. Sweden Weekend (a magazine about Europe from the Radio E consortium, on the first week) Sweden Today (George Wood presents the voices of Sweden, the second week) Spectrum (Bill Schiller covers the Swedish cultural scene, the third week) Studio 49 (conversations on ideas and long-term trends in Sweden and the Nordic region, the fourth week)

1500 UTC / 10am E / 7am P - Page 52 Freqs

SUNDAY
1505 R. Australia The National Interest (Terry Lane looks at the major issues of the week)
R. Canada Int. The Sunday Edition (continues from 1410)
1506 BBCWS(am) White in Africa (refer to 0106 F)
1520 China R. Int. In the Spotlight (refer to 1320 S)
1532 BBCWS(am) People and Politics (inside British politics)

MONDAY-FRIDAY
1505 R. Australia Asia Pacific (refer to 1110 M-F)
R. Canada Int. Sounds Like Canada (continues from 1405)

MONDAY
1506 BBCWS(am) Health Matters (reports on the latest medical research)
1530 China R. Int. People in the Know (refer to 1330 M)
R. Australia The Health Report (Dr. Norman Swan's weekly report on health and medical issues)
1532 BBCWS(am) We've Been Here Before (refer to 0032 M)
1545 R. Canada Int. Out Front (grass roots Canadian radio documentaries)

TUESDAY
1506 BBCWS(am) Go Digital (technology journalist Tracey Logan explains the latest in IT)
1530 China R. Int. Biz China (refer to 1330 T)
R. Australia The Law Report (Damien Carrick presents breaking legal stories in Australia and overseas)
1532 BBCWS(am) Music Review (news, views & personalities from the world of music)
1545 R. Canada Int. Out Front (refer to 1545 M)

WEDNESDAY
1506 BBCWS(am) Discovery (in-depth exploration of science and technology topics)
1530 R. Australia The Religion Report (Stephen Crittenden examines the way religion and societies interact)
1532 BBCWS(am) Westway (refer to 0232 H)
1545 BBCWS(am) Heart & Soul
R. Canada Int. Out Front (refer to 1545 M)

THURSDAY
1506 BBCWS(am) One Planet (stories about the environment, development, agriculture and human impact on the natural world)
1530 R. Australia The Media Report (Mick O'Regan takes a critical look at the latest developments in the communications industry)
1532 BBCWS(am) The Word (refer to 0232 F) World Book Club (refer to 0232 F)
1545 R. Canada Int. Out Front (refer to 1545 M)

FRIDAY
1506 BBCWS(am) Science in Action (Richard Black reports on science and technology)
1530 China R. Int. Life in China (refer to 1330 F)
R. Australia The Sports Factor (Warwick Hadfield presents reports which debate and celebrate the cultural significance of sport)
R. Canada Int. C'est La Vie (Bernard St.-Laurent presents a program about life in Quebec and French-speaking Canada)
1532 BBCWS(am) Westway (refer to 0232 A)
1545 BBCWS(am) What's the Problem? (refer to 0245 A)

SATURDAY
1505 R. Canada Int. The Vinyl Cafe (Canadian humorist Stuart McLean with music and tales centered around a mythical record store)
1506 BBCWS(am) Sportsworld (continues from 1405)
1530 China R. Int. Listeners' Garden (refer to 1330 A)

1600 UTC / 11am E / 8am P - Page 52 Freqs

SUNDAY
1600 BBCWS(am) World Briefing
KWHR(9930kHz) ..... DXing with Cumbre (Marie Lamb with the hottest DX catches)
1605 R. Australia Books and Writing (Ramona Koval conducts in-depth discussions focusing on books, ideas & writing)
R. Austria Int. Insight Central Europe (regional current affairs produced jointly by eastern European broadcasters)(repeated at 1635)
R. Canada Int. The Sunday Edition (continues from 1410)
1632 BBCWS(am) World Business Review
1640 BBCWS(am) The Instant Guide

MONDAY-FRIDAY
1600 BBCWS(am) World Briefing
1605 R. Australia Bush Telegraph (a daily magazine highlighting rural and regional issues)
1615 R. Austria Int. Report from Austria (a daily 15 min. magazine focusing on Austria & central & eastern Europe)(repeated at 1645)
1620 BBCWS(am) British News
1632 BBCWS(am) World Business Report
1640 BBCWS(am) Sports Roundup (all the daily sporting news worldwide)

MONDAY
1645 BBCWS(am) Analysis (background to a story in the news)

TUESDAY
1645 BBCWS(am) Analysis (background to a story in the news)

WEDNESDAY
1645 BBCWS(am) From Our Own Correspondent (refer to 0306 S)

THURSDAY
1645 BBCWS(am) Analysis (background to a story in the news)

FRIDAY
1645 BBCWS(am) Analysis (background to a story in the news)

SATURDAY
1605 R. Australia Hindsight (Australian social history)
R. Austria Int. Insight Central Europe (regional current affairs produced jointly by eastern European broadcasters)(repeated at 1635)
R. Canada Int. Quirks and Quarks (Bob McDonald with what's new and next in science)
1606 BBCWS(am) Sportsworld (continues from 1405)

1700 UTC / 12pm E / 9am P - Page 53 Freqs

DAILY
1700 R. Japan News (a round-up of Asian and world news)

SUNDAY
1705 R. Australia Sound Quality (refer to 1205 F)
1710 R. Japan Pop Joins the World (a look at Asia as it is now, presenting the cultures and lifestyles of other Asian countries through their popular music)
1730 VOA Africa Music Time in Africa (Rita Rochelle highlights the best of traditional and modern African music)(broadcast in two editions with part two airing at 1930)

MONDAY-FRIDAY
1705 R. Australia Australia Talks Back (a daily national talkback program)
VOA News Now .... Talk to America (Carol Pearson hosts a worldwide call-in show featuring American decisionmakers, personalities and experts)
1715 R. Japan 44 Minutes (current affairs magazine about Japan and Asia)

SATURDAY
1705 R. Australia The Spirit of Things (refer to 1205 S)
1710 R. Japan Hello from Tokyo (listener letters, music and short features)

2100 UTC / 4pm E / 1pm P - Page 55 Freqs

DAILY
2100 BBCWS(am) Newshour (60 minutes of news and analysis from around the globe)
R. Japan News (a round-up of Asian and world news)

SUNDAY
2105 VOA News Now .... Jazz America (the best of jazz, past and present, with Russ Davis)
2110 R. Australia AM (ABC Radio's flagship morning news magazine)
R. Japan Pop Joins the World (a look at Asia as it is now, presenting the cultures and lifestyles of other Asian countries through their popular music)
2130 R. Australia Country Breakfast (Australia beyond the urban fringe)

MONDAY
2105 VOA News Now .... American Gold (pop music classics with Ray Freeman)
2110 R. Australia AM (refer to 2110 S)
2125 R. Japan Japan Music Treasure Box
2130 R. Australia Earthbeat (environmental issues raised by economic development)

TUESDAY-SATURDAY
2115 R. Japan Asian Top News (the day's major stories as reported by the region's radio stations)

TUESDAY
2105 VOA News Now .... Roots and Branches (Katherine Cole with roots music)
2110 R. Australia AM (refer to 2110 S)
2130 R. Australia Innovations (showcasing Australian invention, enterprise and ingenuity)

WEDNESDAY
2105 VOA News Now .... Classic Rock (Ed Kowalski and Margot Braswell play classic rick tracks)
2110 R. Australia AM (refer to 2110 S)
2125 R. Japan Japanese Musicscape (songs rooted in the lifestyles of each region of Japan, introducing the local traditions, history and culture)

THURSDAY
2100 WWCR(15825kHz) .. DX Partyline (Allen Graham hosts HCJB's weekly program for DXers and SWLs)
2105 BBCWS(am) Discovery (refer to 1505 F)
VOA News Now .... Top 20 Countdown (Ray McDonald surveys hit music in the USA)
2110 R. Australia AM (refer to 2110 S)
2130 BBCWS(am) Sports International (refer to 1530 F)
R. Australia All in the Mind (the mental

universe, the mind, the brain and human behavior)
WWCR(9475kHz) ... World of Radio (the first weekly airing of Glenn Hauser's comprehensive review of the week in shortwave and international broadcasting)

FRIDAY
2105 BBCWS(am) One Planet (refer to 1505 M)
VOA News Now .... Country Hits USA (Mary Morningstar with country music)
2125 R. Japan Music Beat (contemporary Japanese popular music)
2130 BBCWS(am) Documentaries (refer to 1530 M)
R. Australia In Conversation (Robyn Williams interviews people about what science has meant to their lives)

SATURDAY
2100 BBCWS(am) Newshour (60 min. of news and analysis from around the globe)
2105 R. Australia Australia All Over (Ian McNamara—aka "Macca"—hosts this celebration of Australiana and traditional Australian customs and values)(begins at 1900)
R. Prague Insight Central Europe (regional current affairs magazine produced jointly by eastern European broadcasters)(repeated at 0235)
VOA News Now .... Jazz America (refer to 2105 S)
2115 R. Japan Weekend Japanology (a program designed to present various aspects of Japan in a friendly and relaxed atmosphere with interviews, music and discussions)

2200 UTC / 5pm E / 2pm P - Page 55 Freqs

SUNDAY
2200 RVi Belgium Radio World (Frans Vossen presents a weekly report about international radio)
WBCQ(7415kHz) ... Radio Free Euphoria (freeform radio)
WHRI(5745kHz) DXing with Cumbre (Marie Lamb with the hottest DX catches)
2205 R. Canada Int. Canada in the World (refer to 2135 F)
2206 BBCWS(am) Documentaries (refer to 0106 T)
2210 R. Australia AM (ABC Radio's flagship morning news magazine)
2232 BBCWS (am) In Praise of God
2240 R. Australia Australia Wide (a roundup of "home" news from ABC Newsradio)
2245 R. Prague Czech Books (fortnightly) or Encore (Czech classical music)(monthly) Magic Carpet (world music from Prague)(monthly)

MONDAY-FRIDAY
2200 RVi Belgium Flanders Today (refer to 0400 T-A)
2205 BBCWS(am) World Business Report
2220 BBCWS(am) British News
2230 BBCWS(am) Sports Roundup (all the daily sporting news worldwide)

MONDAY
2200 WBCQ(7415kHz) ... Jean Shepherd (the noted humorist's classic radio programs from the 60s and 70s)
2206 BBCWS(am) Health Matters (refer to 0206 T)
2210 R. Australia AM (refer to 2210 S)
2232 BBCWS(am) We've Been Here Before (refer to 0032 M)
2240 R. Australia Australia Wide (refer to 2240 S)

TUESDAY
2206 BBCWS(am) Go Digital (refer to 0206 W)
2210 R. Australia AM (refer to 2210 S)
2232 BBCWS(am) Music Review (refer to 0232 W)
2240 R. Australia Australia Wide (refer to 2240 S)

WEDNESDAY
2206 BBCWS(am) Discovery (refer to 0206 H)
2210 R. Australia AM (refer to 2210 S)
2232 BBCWS(am) Westway (refer to 0232 H)
2240 R. Australia Australia Wide (refer to 2240 S)

THURSDAY
2206 BBCWS(am) One Planet (refer to 0206 F)
2210 R. Australia AM (refer to 2210 S)
2232 BBCWS(am) The Word (refer to 0232 F) World Book Club (refer to 0232 F)
2240 R. Australia Australia Wide (refer to 2240 S)

FRIDAY
2200 WBCQ(7415kHz.) .. Pan Global Wireless
2205 R. Australia Asia-Pacific Weekend Edition (reports and analysis on the region's events over the past week)
2206 BBCWS(am) Science in Action (refer to 0206 A)
2230 R. Australia AM Saturday (the domestic ABC's Saturday morning news magazine)
WBCQ(7415kHz) ... Pab Sungenis Project (stand-up comedy and sketches)
2232 BBCWS(am) Westway (refer to 0232 A)
2245 BBCWS(am) What's the Problem? (refer to 0245 A)

SATURDAY
2200 BBCWS(am) The World Today (refer to 2200 S)
RVi Belgium Music from Flanders (a half-hour of Flemish music, musicians and musical performances)
2205 R. Australia Correspondents Report (The ABC's overseas reporters give their interpretation and analysis of the week's major events)
2206 BBCWS(am) Play of the Week (refer to 0206 S)

2300 UTC / 6pm E / 3pm P - Page 55 Freqs

DAILY
2300 BBCWS(am) The World Today (refer to 0300 M-F)

SUNDAY-THURSDAY
2300 R. New Zealand Int. Midday Report (news updates and in-depth reports)

SUNDAY
2300 R. Canada Int. The World This Weekend (CBC weekend news magazine)
2310 R. Australia Asia Pacific (Radio Australia's flagship current events and business report for and about Asia and the Pacific region)
2330 China R. Int. People in the Know (interviews with prominent Chinese who are shaping the nation's future)
R. Australia Earthbeat (Alexandra DeBlas presents a program on environmental science)
R. Canada Int. The Inside Track (anthologies and documentaries about sports and those who compete in them)
2345 R. Prague Czech Books (fortnightly) or Encore (Czech classical music)(monthly) Magic Carpet (world music from Prague)(monthly)

MONDAY-FRIDAY
2300 R. Canada Int. The World at Six (the CBC's flagship evening newscast)
2330 R. Canada Int. As It Happens (Barbara Budd and Mary Lou Finley interview newsmakers from the famous to ordinary people eyewitnessing news in the making)

MONDAY
2310 R. Australia Asia Pacific (refer to 2310 S)
2330 China R. Int. China R. Int. ..... Biz China (business and finance in the Chinese market)
R. Australia The Europeans (historical and cultural perspectives on European societies)

TUESDAY
2310 R. Australia Asia Pacific (refer to 2310 S)
2330 R. Australia Rural Reporter (ABC's rural reporters present news and stories from rural and regional Australia)

WEDNESDAY
2300 WBCQ(7415kHz) ... World of Radio (Glenn Hauser's comprehensive review of the week in shortwave and international broadcasting)
2310 R. Australia Asia Pacific (refer to 2310 S)
2330 R. Australia RA Arts (Julie Copeland presents Australian arts & cultural events)

THURSDAY
2310 R. Australia Asia Pacific (refer to 2310 S)
2330 China R. Int. Life in China (a weekly magazine focusing on the lives of ordinary people in China)
R. Australia The Buzz (the week's big technology news and issues presented by Richard Aedy)
WBCQ(7415kHz) ... Uncle Ed's Musical Memories

FRIDAY
2305 R. Australia Lingua Franca (a program about language and its social, cultural and historical ramifications)
2310 R. New Zealand Int. Focus on Politics (a report on government and politics in NZ)
2330 China R. Int. Listeners' Garden (letters, touring, cooking and a language lesson)
R. Australia Hit Mix (Brendon Telfer with a look at the Australian music scene)
R. New Zealand Int. The Sampler (Nick Bollinger casts a critical ear over the latest CD offerings)
WBCQ(7415kHz) ... Wanton Display of Control and Disruption (heavy metal music)
2332 BBCWS(am) Global Business (refer to 0432 S)

SATURDAY
2300 R. Canada Int. The World This Weekend (CBC weekend news magazine)
WBCQ(7415kHz) ... Radio Timtron Worldwide
2305 R. Australia All in the Mind (the mental universe, the mind, the brain and human behavior)
2310 R. New Zealand Int. The Week in Parliament (a weekly roundup of NZ political news)
2320 China R. Int.In the Spotlight (Chinese arts and cultural magazine)
2330 R. Australia Innovations (a program showcasing Australian invention, enterprise and ingenuity)
R. Canada Int. Madly Off in All Directions (Lorne Elliott travels across Canada to capture the country's unique senses of humor)
R. New Zealand Int. Spectrum (a weekly look at the people, places and events around NZ)
WHRI(9495kHz) DXing with Cumbre (Marie Lamb with the hottest DX catches)
2332 BBCWS(am) The Interview (refer to 0332 S)

Thank You ...

Additional Contributors to This Month's Shortwave Guide:

Rich D'Angelo, *NASWA Flash Sheet*; Nicholas Eramo, Buenos Aires, Argentina; Alokesh Gupta, New Delhi, India; Glenn Hauser, Enid, OK, *DX Listening Digest*, *World of Radio;* Jose Jacob VU2JOS, India; Michael Murray, UK; Anker Petersen, *DX Window;* Harold Sellers, Canada, ODXA/DX Ontario; Robert E. Thomas, Bridgeport, CT; Larry Van Horn, MT Asst. Editor; *BBC On Air; BCL News; BCDXC; CIDX; Cumbre DX; DX News; Fineware; Hard Core DX; NASWA Journal; Observer; Worldwide DX Club.*

Larry Van Horn
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Mil Monitoring in Las Vegas

One of our *Milcom* regulars recently returned from a vacation to "America's Sin City" or "Lost Wages" – uh, Las Vegas, that is. He spent some of the time in military monitoring and shares the results with us. So, for the first time since our *Phantoms in the Desert* article that was published several years ago in *MT*, here is an update on military monitoring in the Las Vegas area.

McCarran International
(no UHF frequencies heard)
118.000 Clearance Delivery
118.400 Approach/Departure
118.700 JANET Operations "Gold Coast"
118.750 Tower – Runway 01-19
119.400 Approach/Departure
119.900 Tower – Runway 07-25
120.450 Approach/Departure
121.100 Ground Control East
121.900 Ground Control West
123.825 Helicopter Control (helicopter tours)
124.400 Ramp Control
125.025 Approach/Departure
125.600 Approach/Departure
125.900 Approach/Departure
127.900 International Flights Ramp Control
132.400 ATIS
133.950 Departure Control
135.000 Approach Control

Nellis AFB
119.350 Nellis Control <Button 8>
120.900 Clearance Delivery <Button 2>
121.800 Ground Control <Button 3>
124.950 Approach Control <Button 6>
126.650 Nellis Control <Button 7>
132.550 Tower <Button 4>
135.100 Departure Control <Button 5>

138.025 Air-to-air [*My notes show 57FW Weapons School F-16 air-to-air-LVH*]
139.750 Air-to-air [*Exercise air-to-air training-LVH*]
140.375 Air-to-air [*57FW/414CTS MIG air-to-air-LVH*]
141.625 Air-to-air [*Exercise air-to-air training-LVH*]
148.075 Flightline Repeater Net-1
148.175 Flightline Repeater
148.250 Rescue Repeater
148.300 Repeater [*POL trucks dispatch net-LVH*]
148.450 MOC Repeater
148.525 Ramp Control/Tower Repeater
148.700 Flightline Repeater
149.325 Flightline Repeater
149.475 Repeater [*Flightline Munitions Operations-LVH*]
149.550 Flightline Repeater "HOSS inbound"
150.125 Flightline Repeater
163.375 Security Repeater
163.4875 Security
173.5875 Fire

254.400 Nellis Control <Button 8> [*Beatty/Lee Range Control-LVH*]
264.600 Air-to-air
266.000 AWACS "Darkstar"
270.100 ATIS <Button 11>
273.550 Approach Control <Button 6>
275.800 Ground Control <Button 3>
276.400 AWACS/ACM [*Range Control/Operations-LVH*]
288.800 Range 65 – "Snake 1" (A-10)
289.400 Clearance Delivery <Button 2>
291.600 Joshua Approach
292.200 Range 62
295.400 AR-641A/B
305.600 Supervisor of Flying (SOF) <Button 9>
308.600 AWACS "go White 8"
317.450 ATIS
317.525 Nellis Control <Button 7> (new UHF freq) [*Mormon Mesa Range/Las Vegas Range Control-LVH*]
319.700 Range 64 (A-10's) [*Ringo Ops-LVH*]
321.300 Ground Controlled Approach (GCA) /In-Flight Emergency (IFE)
322.300
323.900 Metro
326.200 Supervisor of Flight (SOF) (shown as SFA Charlie)
327.000 Tower <Button 4>
333.550 Air-to-air <Button 19>
349.200 AWACS/ACM
352.050 Los Angeles Center (ARTCC) <Button 18>
352.800 Departure Control <Button 5>
357.100 Air Combat Maneuvering (ACM) <Button 16> "Banyard"
361.500 Operations <Button 20> [57FW Weapons School Operations "Falcon Ops" -LVH]
372.200 Pilot-to-Dispatch (PTD)
377.100 Los Angeles Center (ARTCC) <Button 17>
377.800 "Airboss" <Button 15> [Range Control/Operations "Blackjack" -LVH]
392.775 Jolly Ops (helicopter identification "Tarzan")

409.025 MOC Repeater
411.350 Repeater
411.375 Repeater
411.850 Flightline Repeater "RED 1, 3," "what net is Lakenheath on?"
413.275 MOC Repeater. German AF
413.400 MOC Repeater
415.625 Repeater. Foreign language, possible Italian.

Indian Springs
(no activity while there)
121.125 ATIS
173.9375 Repeater

❖ DOE / Nevada Test Site Trunk System

400 MHz Motorola Astro. Never could get any of the sites to track, even rotating one control channel at a time in and out of the scanner. The Astro channels had clear and secure voice. One occasion heard mention of a convoy meeting FBI and waiting on a K-9.
406.1125 Control
406.4000 Astro
407.2500 Control
407.9500 Control
407.9875 Astro
408.1750 Astro
408.1875 Astro
409.1250 Astro
409.6375 Astro
409.6875 Control
409.7750 Astro
410.1250 Astro
410.5500 Astro
411.6000 Astro

GE Provoice System
407.3625 Control
407.6500
408.3625 Control
409.3625 Control

Federal Government
166.300 Lake Meade National Recreation Area - Repeater (paired with 166.900 MHz)
166.325 Zion National Park, Utah - Repeater and simplex (paired with 166.925 MHz)
169.400 Bureau of Land Management - Repeater (paired with 168.525 and controlled by 408.425 MHz)
169.875 Humbolt/Toiybe National Forest Repeater "Las Vegas Heli Base" (paired with 170.475 MHz, controlled by 411.225, 411.275, 411.325, 411.525, 411.550 411.575 MHz and microwave links)
170.050 Unknown user "fee collectors" - Repeater [*Definitely an Interior Department assignment. My best guess is the Grand Canyon Park -LVH*]

❖ More KSC/CCAFS Trunk System Updates

Our anonymous reporter on the Space Coast of Florida has passed along some additional updates on the NASA trunk system (see the September 2003 *Fed Files* column).

976 Kennedy Space Center (KSC) Fire (173.5625)

1136	(KSC) Fire Alarm Technicians (173.7875)
1152	Cape Canaveral Air Force Station (CCAFS) Unknown user/usage
1200	(KSC) Unknown user/usage "just testing"
1248	(KSC) Tech Control on Emergency Talk Group
1296	(KSC) Medical (173.4375)
1616	(KSC) Safety (173.6625)
1648	(KSC) Orbiter Operations (165.4125)
1680	(KSC) Safety Secondary (173.4625)
1760	(CCAFS) Safety B Net (163.5125)
1936	(KSC) Security (173.6875)
1952	(CCAFS) Security (165.0875)
5776	(KSC) Unknown user/usage (possible Maintenance Net 107)
6736	(CCAFS) Photo/Timing Net
6800	(KSC) Telemetrics Net (165.1875)
7056	(KSC) Unknown user/usage "ready to go?"
8336	(KSC) Unknown user/usage
9936	(KSC) Public Affairs Officer (163.5375)
10896	(KSC) possible crane operations net
11536	(KSC) Shuttle Landing Facility Tower (165.6125, 128.550)
11696	(KSC) Elevator Base
12496	(KSC) Launch Support (162.6125)
13136	(KSC) Possible transportation net
14096	(KSC) Utilities "Bravo Control" (171.000)
14256	(KSC) Eagle Control (power utilities)
18000	(CCAFS) Conduit or cable pulls
18192	(CCAFS) Weather Base
32336	Patrick AFB (PAFB) Security (secure and clear)
32384	(PAFB) ____ Maintenance
32656	(PAFB) Fire Control
34256	(PAFB) EOD Control
34576	(PAFB) Civil Engineers
34896	(PAFB) Unknown user/usage "COSO, ROBIN 4"
34928	Unknown user/usage "hazardous operations at pad 20, remain clear"
36512	(PAFB) MOC
36816	(CCAFS) Pad Operations (secure and clear)

Many thanks to my good friend on the Space Coast for the update.

❖ 104th Fighter Wing Frequencies

A longtime friend of this column, Ken Windyka in Springfield, Massachusetts, got a good look in the cockpit of a 104th FW A-10 aircraft during a recent airshow and passes along the info from the freq card in the aircraft.

AM UHF

Channel	Freq	Usage
1	303.000	Hawk Ops
2	289.400	BAF Ground Control
3	251.100	BAF Tower
4	325.800	BDL Approach
5	379.100	Boston Center
6	275.850	Boston Center
7	307.200	ALB Approach
8	255.800	FSS
9	257.650	SAC Approach
10	267.800	Range 35
11	290.250	SAC Tower
12	338.200	Boston Center
13	381.400	Boston Center
14	282.800	Boston Center
15	343.800	Boston Center
16	317.700	Boston Center
17	282.300	New York Center
18	381.600	New York Center
19	286.200	Warren Grove
(no num.)	399.800	T.O.D.

FM VHF

1	139.900	
2	141.675	
3	41.450	
4	36.350	
5	36.825	
6	419.950	FOL
7	34.550	OPS
8	38.650	

AM VHF

1	138.050	OPS/MOCC
2	138.250	INTER F1
3	(blank)	
4	127.100	BAF ATIS
5	121.700	BAF GND
6	118.900	BAF Tower
7	134.350	FOL
8	114.000	CEF ATIS
9	118.350	CTAF GND
10	134.850	CEF Tower
11	141.900	BDL Ops
12	118.150	BDL ATIS
13	121.900	BDL GND
14	120.300	BDL Tower
15	132.050	PSM ATIS
16	120.950	PSM Ground
17	128.400	PSM Tower

Thanks, Ken, for that exclusive look at the frequencies used by the 104th Fighter Wing.

❖ Milair Frequency Changes

We have quite a few changes this month to report. Thanks to Milcom regular Jack NeSmith for keeping us up-to-date and for filling in some of the unknown "spectrum holes."

Cleveland ARTCC (KZOB)
Hopkins Sector Paris RCAG Change 348.70 to 284.675 MHz (Milair spectrum hole)
Mansfield Sector Mansfield RCAG Change 317.7 to 269.475 MHz
Toledo Sector Carleton RCAG Change 119.95/269.5 to 135.375/251.125 MHz

NAS/JRB Carswell (KNFW)

Metro	Change 342.5 to 342.55 MHz
Local (Primary)	269.325 MHz (MilAir spectrum hole)
Ground (Primary)	254.325 MHz
GCA (Common)	371.875 MHz
Base Operations	291.775 MHz

NAS Jacksonville (KNIP)
Metro Change 344.6 to 343.5 MHz

NAS North Island (KNZY)
ATIS Change 283.0 to 317.8 MHz
Metro Change 344.6 to 342.35 MHz

NAS Whidbey Island (KNUW)

Approach Control	Change 322.0 to 322.5 MHz, 286.0 to 286.65 MHz, 325.2 to 327.0 MHz, and 346.0 to 343.75 MHz
ATIS	Change 280.3 to 281.5 MHz
Departure Control	Change 300.4 to 299.6 MHz
Metro	Change 344.6 to 343.4 MHz

Pope AFB (KPOB)

Supervisor of Flying	Change 233.4 to 343.0 MHz

Wheeler-Sack AAF (KGTB)

RW air-to-air advisory	71.30 MHz (used in R5201 and the Fort Drum Cantonment area)

Whiteman AFB (KSZL)
Pilot-to-Dispatcher VHF 118.725 MHz

❖ NATO Daily Callsign

During a recent conversation on *Milcom* monitoring, a question was asked regarding what is the procedure for changing the NATO daily callsigns? And from an anonymous expert the answer is, "The NATO three letter daily changing callsigns (trigraphs) have two letters and one number. Number can be in the first or second spot. The book containing these callsigns is as thick as a phone book."

Thanks to our topic expert for sharing this bit of *Milcom* trivia with our readers.

❖ Reader Request

One of our *MT* readers is looking for some help monitoring the new trunk radio system at the Marine Corps Logistics Base Barstow, California. According to the information available, this is supposed to be a digital EDACS VHF trunk system being installed.

The company contracted to put the system in place is called Cazcom TBA High Desert Communications; their home page is located at **http://www.cazcom.net**. According to the system manufacturer, Com-Net Ericsson Critical Radio Systems, this is a four channel system. An additional four channels will be added to the system at a later date.

The logistics base is comprised of three principal sites. Nebo, which encompasses 1,568 acres, functions as the base headquarters and is the main facility for administration, storage, recreational activities, shopping and housing functions. The Yermo Annex encompasses about 2,000 acres and is primarily a storage and industrial complex, and the third site, approximately 2,500 acres, serves as rifle and pistol ranges.

The trunk VHF communications system will be used to support all base operations over the 6,068 acre base, including military police. The communications site will be located at Elephant Mountain and will provide coverage for the entire base. If any of our readers has any information on the eight VHF frequencies in use we would like to hear from you.

And that wraps up another month of *Milcom* in the pages of *Monitoring Times* magazine. If you have anything you would like to share with our readers, please contact me at the address in the masthead. Also a reminder – our annual airshow column is two months away. If you attended a show within the last year I am interested in your airshow report and the frequencies you monitored during the show. Until next month, 73 and good hunting.

Chris Parris
chrisparris@monitoringtimes.com

Back to the Basics

Hello to all the *Fed Files* fans from your newest columnist! My name is Chris Parris and I am a television-broadcasting engineer by profession, but I have been an avid federal frequency monitor since I got my first programmable scanner (a Bearcat 210) back in 1975. I am very thankful to Larry Van Horn and all the folks at *Monitoring Times* for the chance to contribute to the Federal Files column, and I will continue to provide an exchange of timely and useful information on federal radio monitoring.

Scanning federal communications is different from listening to your local police and fire calls. It involves a slightly different set of fundamentals and a bit more listener involvement. I thought we might start by taking a step back and looking at some of the basics involved in federal monitoring.

❖ Equipment Check

In past years you didn't really need any specialized scanning radios to listen to federal radio traffic, but things are starting to change. While some agencies will probably remain in the analog FM mode that most scanners receive, many are now upgrading their radios to digital models that transmit in modes that render an ordinary scanner useless. But, many of the new digital federal radios appear to be using the APCO P-25 digital mode that can be received using the new Uniden or Radio Shack digital scanners. While the P-25 digital mode can be encrypted, which means you can't listen in, many agencies are not using that feature, or using it only occasionally.

Federal agencies can use tone squelch or CTCSS (Continuous Tone Subaudible Squelch) on their communications systems. This feature allows only transmissions using a particular subaudible tone to be heard on their radios and your scanner. Many agencies like to use a particular CTCSS (sometimes referred to as "PL") tone all the time. Having a scanner with this feature is a big plus for federal monitoring. This helps in identifying which agency you might be listening to when a new federal frequency comes up.

❖ Use That Search Button

At home, I always have one or two scanners doing nothing but searching segments of the federal frequency allocations. There are literally thousands of frequencies available for use by federal agencies, so always be on the lookout for new activity that may be used only occasionally. Any time there is a big event near you that may involve some federal agencies, start searching for new active frequencies. Most federal activity will be in the VHF High Band, (162 to 174 MHz) and the UHF Band (406 to 420 MHz). Use the FM mode and 12.5 KHz steps when searching these bands. There may also be some non-military activity in the 138 to 150 MHz portion of the VHF High Band as well as the 30 to 50 MHz VHF Low Band.

❖ Research

Many folks may not have any idea which federal government agencies have operations in their area. A good place to start is the government pages in your local telephone directory. Check out which federal agencies have offices or facilities in your city or nearby areas. Even small towns and rural areas can host the offices of federal agencies, such as the Fish & Wildlife Service, Forest Service or others.

Not all federal agencies will be using radios, but many that you may not know about do have frequencies and radio systems available for their use. Once you do pick up some activity on new frequencies, it can be difficult to figure out who is using these channels without some digging. Be sure and listen for call signs, locations or other clues that might help identify who is using a particular channel.

Since federal frequencies are not licensed with the FCC, we can't look up any license information to confirm who is using a specific frequency, so we tend to rely on the generosity of other federal monitors when looking for specific information. There are several good E-mail lists that offer an exchange of federal scanning information, including the FEDCOM list at the QTH.net server.

You can check for those unidentified frequencies in some of the published books and databases, including the Grove *Federal Frequency Directory* CD-ROM, or take a look at the frequency allocation table in the back of the Radio Shack *Police Call* books. You can also check one of the hundreds of scanner frequency web sites out on the Internet containing federal frequencies. Beware that some web sites seem to contain the same lists that have been floating around for years, listing many outdated and misidentified frequencies.

❖ Be Patient

Many federal frequencies can go for long periods of time with little or no activity. This lack of activity is due in part to the fact that most federal agency communications are not like your local police or fire channels. Some frequencies may be used only once a day, month, year, etc. For example, many years ago the frequency 162.5000 MHz was allocated in the South Florida for emergency communications between FAA control towers and the NOAA Hurricane Center in Miami. This frequency was active only

once a year when it was tested prior to hurricane season.

Federal law enforcement mainly involves investigative roles that do not normally require a lot of chit-chat on the radios until the investigations lead to arrests or surveillances, and that's when the frequencies can get busy. Years ago, the radio systems of various federal agencies were their main communications link with their offices and units in the field. Today, cell phones and pagers have greatly reduced the amount of "routine" administrative traffic that used to keep the frequencies active. However, most agencies are still maintaining their VHF or UHF radio systems for use in major operations or when coordination with many units occur. We've all been aware of the increased references to Nextel on the federal channels, but even with that capability, agencies will still show up on their radio systems for major operations or surveillances.

One important thing to remember is that federal agencies know we are listening. Over the years I have been monitoring federal communications, there have been many changes in the procedures and the content of radio chatter. As scanner technology has given the listener more access to federal radio channels, they have moved from being fairly open about what they talked about over the radio to being very cryptic and some have even gone to digitally scrambling their communications. Those that haven't gone to encrypted channels are usually aware of the fact that they are being monitored and conduct their radio communications accordingly.

In these times of heightened security concerns for all areas of our society, our hobby monitoring activities can appear to take on a more menacing air than it really is. Absolute discretion is required when performing any "on-scene" monitoring research near federal facilities. We need to be responsible scanner users and never interfere in any of the operations we may hear.

❖ Travel Frequencies

Since my work takes me away from home quite a bit, I try to do some searching through the federal bands whenever I get into a new city. Here is some of what I have logged from my most recent travels. I hope that readers in the cities I have visited will be able to help with some of the unidentified signals.

Denver:

One facility I will focus on in a future article is the Denver Federal Center. This large complex on the Denver metro area's west side is home to many federal agencies, including the Federal Emergency Management Agency. It's a hotbed of communications activity. Here is a small sample of frequencies that were recently active:

166.2750	CSQ (carrier squelch, no CTCSS PL tone) - Unknown agency with security traffic
167.4625	167.9 PL - Denver FBI repeater with clear and DES (Digital Encryption Standard) traffic
170.1750	CSQ - Unknown agency, possibly US Postal Service
413.9250	CSQ - Unknown agency
418.9500	156.7 PL - Denver DEA repeater

Miami:

164.9750	100.0 PL - Clear voice and DES scrambling were noted on what appears to be a joint Customs / Coast Guard operations repeater.
165.9750	100.0 PL - Input frequency to repeater on 164.9750
166.3000	100.0 PL - Reported as Customs Ports of Entry in South Florida
169.7500	162.2 PL - Unknown agency
172.2750	P-25 unencrypted digital - Unknown agency, originally thought to be the Transportation Security Administration at Ft. Lauderdale International, but the frequency doesn't fit in to the known TSA radio plan.
282.425	(AM) – Customs aircraft operations keep this frequency busy in South Florida.

Minneapolis:

164.55000	DES scrambling on what could be an FBI or Customs OCDETF (Organized Crime Drug Enforcement Task Force) frequency.
164.9875	CSQ - Simplex, probably VA Medical Center security.
167.4375	167.9 PL - FBI repeater with a Morse code identifier.
167.5875	167.9 PL - FBI repeater with both clear voice and DES scrambling.
167.6375	167.9 PL - FBI repeater.
409.1375	CSQ - Unknown agency repeater with Morse code identifier.
415.1625	CSQ - Unknown agency repeater.
415.2000	103.5 PL - Federal Protective Service repeater.
418.1000	118.8 PL - Postal Service repeater.

Phoenix:

163.6500	100.0 PL - Border Patrol activity.
163.7500	123.0 PL - Border Patrol aircraft activity.
164.2750	P-25 digital mode - Radio checks, repeater sites identified as "White Tanks" and "Cunningham". Possibly related to traffic on 167.9250.
164.7000	10.9 PL - Simplex, sounded like a security operation of some sort. This frequency is noted as being the Department of Labor in some lists.
165.2375	100.0 PL - Customs and Border Security repeater, both clear and DES, with an aircraft surveillance operation.
165.6375	Kind of a weird one here. Sounds like a P-25 digital repeater stuck on all the time. No voice traffic heard but my digital-capable scanners both lock on as if it were a digital voice channel.
167.3375	167.9 PL - Phoenix FBI with clear radio traffic.
167.3625	167.9 PL - Phoenix FBI in the clear and DES.
167.9250	P-25 digital - Sounded like a new installation with technicians doing radio checks.
170.8500	P-25 digital - More radio checks with the same parties that were on 167.925 MHz.
172.2750	103.5 PL - Unknown agency, transmitter site possibly identified as "Morgan Point".
418.6250	156.7 PL - Phoenix DEA Channel 1 repeater.

Portland:

My home base in Oregon is experiencing some changes in some federal radio traffic, most involving a switch to digital. Recently, the Customs and Border Security repeater in the Portland area (165.2375 repeater out, 166.4375 in) has been using un-encrypted APCO P-25 digital traffic. Also, 417.2000, used by the Federal Protective Service (FPS), was using unencrypted P-25 digital mode for a day or so in Portland. The radio technicians were apparently checking out the digital operation, but reverted back to analog.

During the digital testing I heard various communications centers in other cities, such as Denver (which seems to be the primary dispatch center for this part of the country), Philadelphia and Auburn, WA, checking in with the Portland techs. My guess is that all the FPS radio traffic will go digital soon as their radios get upgraded.

Washington, D.C:

Washington has to be a federal monitor's dream location. I recently made my first trip to the area and was totally overwhelmed by the sheer volume of active federal VHF and UHF frequencies and trunked systems. I will focus on this area in a future *Fed Files* column. An interesting catch was some unencrypted P-25 digital traffic on 165.6875. This frequency is reported as the Washington, DC Secret Service Field Office. The other usual Secret Service frequencies were also active, but all with digital encryption.

❖ Input, We Want Input

Anyone in these cities who may be able to help identify some of these unknown frequencies is encouraged to submit that information to us at the *Fed Files*. Do you have any unknown frequencies in your area? Go ahead and send those in and maybe we can help figure out who you are monitoring. I'm also interested in hearing from folks who have done some federal scanning while traveling and what they have heard.

We meet next in May. Stay safe and keep searching!

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Days of a Stormy Sun

I have come to the conclusion that *MT*'s editors are psychic. What other explanation could one have for the perfect timing of the picture on the front cover of the November issue?!

For those who've forgotten – or who buy their copies at the newsstand and missed November – that issue had a picture of the sun, complete with a large solar flare. I doubt many of you have forgotten what happened to radio propagation in late October and early November! The media brought us a variety of dire predictions of technical disaster, a few of which actually came true. The effects on the radio spectrum have certainly been dramatic.

Severe solar storms cause increased absorption of signals in northern latitudes. In a modest storm, it's not unusual for stronger northern stations like WCCO-830 (Minneapolis), WJR-760 (Detroit), and WBZ-1030 (Boston) to become much weaker or disappear altogether. The result is often to allow weaker southern signals like WFNO-830 (Louisiana) and even foreign stations like Jamaica-760 and Haiti-1030 to appear.

The October solar storms went far beyond typical levels. Many DXers reported that, for brief periods, there was *no* skywave DX to be heard. Despite it being well after dark, the only stations that could be heard were the same nearby stations that are heard during the day. Other DXers reported all stations to their north completely gone, replaced by Mexico and Cuba.

The effects on VHF may have been more dramatic. First, over the weekend before the peak of the storms, sporadic-E openings were reported as high in frequency as FM. I logged KRZA-88.7 (Colorado) here in Tennessee. Sporadic-E is *extremely* rare in October. But it got better.

TV DXer Mike Cherry near Vancouver, Canada, reported logging KHON-TV channel 2(Honolulu) via sporadic-E on the evening of October 29th. The next evening, hams as far east as Memphis were reporting extremely strong 50 MHz signals from Hawaii. And TV DXers in the South (Louisiana and Texas) reported unusual signals on channel 2. This time, the signals had fading and ghosting typical of F-layer propagation. Both believed they were seeing a "People's Court" logo. While that's by no means conclusive evidence, program guide websites suggest the only channel 2 station carrying "People's Court" at that time was... KHON.

Propagation experts suggest these major solar storms are to be expected as we drop down the falling side of the 11-year sunspot cycle. We may see more propagation like this. When you see news of solar flares, be sure to keep an ear on the AM dials and an eye on channel 2.

❖ Bits and Pieces

WRLL: I'm sure most of you east of the Rockies have heard new expanded-band station WRLL near Chicago by now. Patrick Griffith landed one of the first WRLL QSLs. The address is 233 North Michigan Ave., #2800, Chicago IL 60601. DXers who grew up in the Midwest in the 1960s and 1970s will certainly recognize WRLL announcers like Tommy Edwards and Larry Lujack. There's more information about this station on their website **http://www.realoldies1690.com**

A new expanded-band station is operating on 1690 out of Chicago.

Booster Shot: Back in November, I mentioned Patrick's trip to Santa Fe, New Mexico, and that city's unusual booster transmitter for KKOB-770 Albuquerque. This month, Patrick claims the first ever QSL from KKOB's Santa Fe transmitter. By using an unusually *bad* antenna (actually, no antenna at all!), Patrick was able to be certain he was hearing the relay and not KKOB itself. KKOB's chief engineer Mike Langner agreed, verifying what he called "...the first official reception report of the booster ever received..."

US Gov Callsigns: Two of you wondered about my comment about U.S. Government stations not requiring call letters, in the October issue. Arnal Cook N9ACC wrote from Indiana reminding me that the NOAA weather radio stations *do* have call letters – KWO-39 Chicago, KIH-43 Louisville, etc..

Phil Glasso K2PG notes that most of the Voice of America sites also had call letters once upon a time. A New Jersey site (abandoned by the VOA in 1965) signed WNRA, WNRI, WNBC, WRCA, and WBOU over the years; the recently-abandoned Bethany, Ohio, site was WLWO; and Delano, California, was KNBH. All of these callsigns were associated with domestic broadcasters (NBC and WLW) which first built these stations and then operated them under contract to the government.

Confused Yet? Getting back to the medium-wave topic, AM station WJZ-770 also operated from the New Jersey shortwave site until 1944. Before WWII, FCC regulations allowed one company to own two stations in the same city. (Recent FCC regulations allowing such "duopolies" are not new!) NBC owned both WJZ and WEAF-660. During the war, regulations were changed to limit an owner to one station in a city. NBC sold WJZ (among other stations), creating what's known today as ABC.

With the sale, WJZ was "evicted" from NBC property, and ended up at its current location in Lodi, New Jersey. WJZ is today WABC; WEAF was WNBC for years and is today known as WFAN. (And is now owned by CBS. It also shares a tower with WCBS, but that happened long before the stations were co-owned. I probably shouldn't try to confuse you further, but the station today known as WCBS at one time held the calls WABC!)

TIS Indeed: Arnal Cook also has some Travelers' Information Station (TIS) information. Several new stations have gone up on US-31 between Indianapolis and Kokomo. They operate in conjunction with the electronic sign boards used to warn of traffic tieups and to present "Amber Alerts." Two similar TISes have been installed here in the Nashville area (both on 1640 kHz) for the same reason.

The station on Kokomo's south side uses a 25-foot whip antenna, topped with both a 6-wire "capacitance hat" and two circular loops. A "capacitance hat" consists of wires sticking out horizontally from the whip. Its purpose is to change the resonant frequency of the antenna. The whole antenna at Kokomo is mounted on a 3-foot 3-legged tower, similar to that commonly used by hams. I've seen such stations in many other places. Unfortunately, such places are usually on the shoulders of Interstate freeways, making it rather dangerous to stop and take pictures!

Arnal has seen several more in Central Indiana. One is in Westfield, 16 miles north of Indianapolis on US-31; another is east of Noblesville, on I-69 about 17 miles northeast of Indianapolis. The latter station is associated with a nearby music park, which triggers huge traffic jams during major concerts. Both of these use simpler antennas – "helical whips on a box" only about 15-ft high.

Write me at 7540 Highway 64 West, Brasstown NC 28902-0098, or by email to dougsmith@monitoringtimes.com. Good DX!

OUTER LIMITS

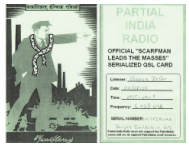
THE CLANDESTINE, THE UNUSUAL, THE UNLICENSED

George Zeller
georgezeller@monitoringtimes.com

Pirate Commentary or Personal Attacks?

It has been increasingly common in recent months for pirate radio stations to include personal attacks as part of their programming. Many stations try to do this in an amusing fashion, as part of a comedy format. But, some *MT* readers have wondered whether it is appropriate to make fun of other DXers as part of pirate broadcasts. Of course, by definition, pirates can broadcast any program content that they feel like producing and transmitting. But, most quality productions by pirate stations can manage to entertain us without engaging in personal attacks on other radio hobbyists.

One of the more amusing examples of this personal reference by pirate stations is the new QSL that we picture here this month from **Partial India Radio.** The station has a well-deserved reputation for producing good parody material on just about anything. As we see here, their new QSL makes fun of the personal ridicule problem in pirate radio.



Local Pirates

Our coverage of unlicensed broadcasting in *Monitoring Times* each month is always heavily concentrated on North American shortwave pirate transmissions. But, huge numbers of additional unlicensed broadcasting signals are audible from political clandestine programming, broadcasts by intelligence services, and local pirates on the standard FM and AM medium wave bands. Although the range of local pirate transmitters is generally limited, many dozens of them are operating at any given moment. Thus, it is always a good idea to scan your local broadcasting bands, in case any such transmissions are active in your area.

For instance, veteran DXer Harry Helms forwards an item this month that was originally posted by Jim Thomas on the *WTFDA List.* Jim has been hearing a local pirate with an ID of **High Country Radio** on 103.9 MHz FM in Milliken, CO. The station's format is a mix of music and old time radio reruns. This one may still be there by the time that you read this, or it might be gone by now. But, whether or not you live in Colorado, a bandscan of your local broadcasting frequencies can sometimes reveal a pirate operation. Richard Kramer informs *MT* that he has been hearing a local pirate relay of licensed **WBCQ** on 103.5 MHz FM in Reading, PA. Harry Helms also notices **Phat Rock Radio** on 1650 kHz in Las Vegas, NV.

But, during most months, the FCC announces that they have closed down a local FM or medium wave pirate, such as the October 16 bust of **San Francisco Liberation Radio** in California. So, if you want to hear local pirates, you sometimes have to act quickly.

Sad News

It is our sad duty to report that veteran DXerAndrew Rugg, VA3TEE of St. Catharines, Ontario,passed away at his home on October 9. Andy wasnot primarily a pirate DXer, but he is missed byhis many friends in the radio monitoring hobby.

Argentina Pirate

Many North American DXers have had the thrill of hearing a pirate broadcaster from South America because of the fairly frequent activity of **Radio Cochiguaz**. But, this is not the only South American pirate that is sometimes audible on other continents. Alejandro Garcia's **Radio Bosques** has sometimes been heard from Argentina during the past couple of months. It has been using the fairly unusual (if slightly variable) frequency of 6193 kHz, normally around 0100 and 1000 UTC. Listeners have reported that their slogan is "RAL." If you hear this relatively rare DX catch, they are anxious to receive e-mailed reception reports to their *radio_bosques@yahoo.com* e-mail address.

Euro Maildrop Change

Quite a few European pirates have used the SRS Germany address as their maildrop in the past. This former Merseburg address has been changed. From now on, these stations will be using "SRS Deutschland, - station name -, Postfach 101145, 99801 Eisenach, Germany," for reception reports and other correspondence.

What We Are Hearing

Our readers heard all of these North American pirate broadcasters this month, despite the well publicized solar flares that disrupted the ionosphere during the fall. All pirates operate on a sporadic schedule, but shortwave pirate broadcasting increases noticeably on weekends, and during major holiday periods. You have to tune but the new main North American pirate frequency of 6925 kHz, plus or minus 30 or 40 kHz, is the place to scan.

Betty Boop Radio- Primarily a novelty station, with an obvious heritage in old cartoon characters. (Providence)

Grasscutter Radio- Rock music and pirate radio commentary. (Uses *grasscutterradio@yahoo.com* e-mail)

Happy Halloween- One of the genre of pirates who appear around major holidays. Novelty music with a Halloween theme. (None)

Lubavitcher Radio- Unusual Jewish medium wave pirate heard by many listeners on the east coast. Their frequency is 1710 kHz. (None known)

Oxycontin Radio- Odd combination of drug advocacy and pirate radio advocacy, normally entertaining. (None)

Radio Spaceshuttle International- Europirate appeared fairly regularly on our side of the ocean during the fall, normally using 15810 kHz for their rock music. Interesting *http://spaceshuttle.freeservers.com/index.html* web site. (Herten)

Radio FCC- It is extremely doubtful that the Federal Communications Commission has anything to do with this oldies rock pirate. (None)

Ragnar Radio- Some recent shows have featured country music, but not their exclusive format. (Uses *rangarradio@yahoo.com* e-mail)

Shorty Longwire Radio- New pirate features rap music and pirate radio discussions; no contact information so far. (None; asks for reports via the Free Radio Network)

Sunshine Radio- Rock oldies format features an announcer with a pronounced southern accent, which sometimes makes his identifications difficult to copy. (None; try *grasscutterradio@yahoo.com*)

Sycko Radio- Pronounced "Psycho" Radio, this now-veteran pirate mixes rock music with political commentary and original station jingles. (None)

Undercover Radio- Dr. Benway normally features discussions of William S. Burroughs and/or pirate radio commentary. Claims to be broadcasting "from the middle of nowhere." (Uses *undercoverradio@mail.com* e-mail)

Voice of Captain Ron Shortwave- Rock music and comedy; very traditional pirate radio format. (Uses *Captainron6955@hotmail.com* e-mail)

Voodoo Radio- Rock music and pirate commentary normally heard; very little voodoo. (Elkhorn)

WHYP- James Brownyard memorial station remains one of the most active pirates on the air today. Format mixes rock music, comedy sketches, and pirate radio commentary. (Providence)

WJAM- New station claims to have a "punk" focus, but miscellaneous rock music and pirate radio commentary dominates. (Try Providence via **WHYP**)

WMPR- Their by-now famous techno rock "dance party" format is easy to identify, but they still fail to communicate with their listeners. (None)

WSDW, Shadow Radio- Mixes relays of old time radio "The Shadow" programs with novelty and rock music. (Uses *the_shadow6950@hotmail.com* e-mail)

continued on page 79

SATELLITE SERVICES

MT TRANSPONDER GUIDE *www.monitoringtimes.com/mtssg.html*

All Frequencies MHz

Robert Smathers
robertsmathers@monitoringtimes.com

Panamsat Galaxy 4R

C-Band - 99 degrees West longitude

1(H) 3720 Data Transmissions / Analog SCPC Audio Services
1443.80 56.20 Chinese audio service
2(V) 3740 Panamsat Galaxy 3D (digital)
3(H) 3760 Data Transmissions / Analog SCPC Audio Services / The Reformation Channel (digital)
1402.00 58.00 Andy Thomas Radio Network
1398.20 61.80 Performance Racing Network
1396.00 64.00 Kansas Audio Reader Network
1395.10 64.90 Occasional Audio
1394.70 65.30 WJR-AM, Detroit, MI - talk radio
1390.95 69.05 Occasional Audio
1383.10 76.90 KIRO-AM Seattle, WA - news/talk/Seahawks football
1382.30 77.70 Motor Racing Network (occ)
1381.20 78.80 KJR-AM Seattle, WA - ESPN Radio
4(V) 3780 WB Network / WB Domestic Television Distribution / WB International Television Distribution (digital)
5(H) 3800 FamilyNet (digital) / WLPG-TV Detroit – Christian Television Network (digital) / WLFG-TV – Living Faith Television (digital) / KCHF-TV Santa Fe, KDAZ-AM Albuquerque (digital)
6(V) 3820 WB Network / WB Domestic Television Distribution (digital)
7(H) 3840 Data Transmissions
8(V) 3860 Data Transmissions
9(H) 3880 XEW-TV Red Canal 2, XHGC-TV Red Canal 5, XEQ-TV Red Canal 9 (digital)
10(V) 3900 Occasional video
11(H) 3920 Mexican television feeds (digital – occ)
12(V) 3940 Occasional video
13(H) 3960 Occasional video
14(V) 3980 Ascent Media New York feeds, Bloomberg TV, Bloomberg Radio (digital)
15(H) 4000 World Harvest Television
6.48, 7.30 WHPZ-FM 96.9 Bremen, IN - "Pulse FM"
7.46 WHRI Americas - World Harvest Radio Angel 1
7.55 WHRI Europe - World Harvest Radio Angel 2
7.64 KWHR Asia - World Harvest Radio Angel 3
7.73 KWHR South Pacific - World Harvest Radio Angel 4
7.82 WHRA Africa/Middle East - World Harvest Radio Angel 5
16(V) 4020 Shepherd's Chapel Network – Dr. Pastor Murray
17(H) 4040 Buena Vista Syndication / Carsey-Werner Syndication / Buena Vista International Syndication
18(V) 4060 Occasional video
19(H) 4080 Occasional video
20(V) 4100 Occasional video
21(H) 4120 Occasional video
22(V) 4140 Occasional video
23(H) 4160 Occasional video
24(V) 4180 Occasional video

Panamsat Galaxy 4R

Ku-Band - 99 degrees West longitude

1(H) 11720 Data Transmissions
2(V) 11740 Data Transmissions
3(H) 11760 Occasional video
4(V) 11780 Headend in the Sky (digital)
5(H) 11800 Headend in the Sky (digital)
6(V) 11820 Headend in the Sky (digital)
7(H) 11840 Headend in the Sky (digital)
8(V) 11860 Data Transmissions
9(H) 11880 Headend in the Sky (digital)
10(V) 11900 Headend in the Sky (digital)
11(H) 11920 Headend in the Sky (digital)
12(V) 11940 Headend in the Sky (digital)
13(H) 11960 Data Transmissions
14(V) 11980 Data Transmissions
15(H) 12000 Data Transmissions
16(V) 12020 Data Transmissions
17(H) 12040 Headend in the Sky (digital)
18(V) 12060 Headend in the Sky (digital)
19(H) 12080 USPS-TV (digital) / Postal Service Training Network (digital)
20(V) 12100 Data Transmissions
21(H) 12120 Data Transmissions
22(V) 12140 Headend in the Sky (digital)
23(H) 12160 Headend in the Sky (digital)
24(V) 12180 Spacecom Systems Spacelink / FM Cubed Transmissions

SES Americom Americom-4

C-Band - 101 degrees West longitude

1(V) 3720 Data Transmissions / Cornerstone Television (digital) / SuperChannel TBN (digital)
2(H) 3740 Data Transmissions
3(V) 3760 Data Transmissions / Daystar Television (digital)
4(H) 3780 Data Transmissions
5(V) 3800 Occasional video
6(H) 3820 Data Transmissions
7(V) 3840 Data Transmissions
8(H) 3860 Telemundo / Mun2 / NBC (digital)
9(V) 3880 Golden Eagle Broadcasting
10(H) 3900 HBO 2 – East (VC2+)
11(V) 3920 (none)
12(H) 3940 HBO 2 – West (VC2+)
13(V) 3960 Data Transmissions / UCTV (digital)
14(H) 3980 **National Programming Service (NPS)**
Fox Sports Net regionals (digital)
Fox Sports West 2
Fox Sports Detroit
Fox Sports Pittsburgh
Fox Sports Rocky Mountain
Fox Sports North – Minnesota
Fox Sports North – Wisconsin
Comcast Sportsnet – Mid-Atlantic
15(V) 4000 Data Transmissions
16(H) 4020 **National Programming Service (NPS)**
Fox Sports Net regionals (digital)
Fox Sports Midwest
Fox Sports Northwest
Fox Sports Arizona
Fox Sports South
Sunshine Network
Fox Sports West
Fox Sports Southwest
17(V) 4040 MoreMax – East (VC2+)
18(H) 4060 (none)
19(V) 4080 HBO Signature – East (VC2+)
20(H) 4100 CBandNet (digital Internet delivery service)
21(V) 4120 Safe TV (digital) / God's Learning Channel (digital) / Familyland (digital)
22(H) 4140 Pay-per-view programming (VC2+ - occ) / Occasional video
23(V) 4160 La Familia Television Network (digital) / Fe TV (digital)
24(H) 4180 Occasional video

SES Americom Americom-4

Ku-Band - 101 degrees West longitude

1(V) 11720 Data Transmissions
2(H) 11740 Fordstar (digital)
3(V) 11760 Data Transmissions
4(H) 11780 Data Transmissions
5(V) 11800 Data Transmissions
6(H) 11820 3 Angels Broadcasting (digital) / Data Transmissions
7(V) 11840 Data Transmissions
8(H) 11860 **Taiwan International Satellite TV** (digital)
Skylink Television
TTV America
CTV America
CTS America
TIS-TV (Taiwan International Satellite TV)
Pacvia-TV 1
Pacvia-TV 2
CEN
MAC-TV – Macroview TV – Taiwan Overseas Chinese Affairs Commission
IFTV – International Family Television
The Asia Network Channel 1
The Asia Network Channel 2
Asia After Dark (Adult)
BCC Taiwan radio
BCC News radio
BCC Pop radio
American Farsi Network (AFN) Iran Radio
9(V) 11880 Data Transmissions
10(H) 11900 Data Transmissions
11(V) 11920 Data Transmissions
12(H) 11940 Data Transmissions
13(V) 11960 Data Transmissions
14(H) 11980 Data Transmissions / Adventist TV, Lifetalk Radio (digital)
15(V) 12000 Data Transmissions
16(H) 12020 Loma Linda Broadcasting Network (LLBN) (digital) / The Christian Television Network (digital) / Data Transmissions
17(V) 12040 (none)
18(H) 12060 Hotelevision (digital)
19(V) 12080 Data Transmissions
20(H) 12100 Data Transmissions
21(V) 12120 **SES-Americom** (digital)
Vietnamese Public Radio Channels 1 and 2
CCTV-9
SES-Americom occasional feeds
TV TRWAM / Radio Maryja
22(H) 12140 Data Transmissions
23(V) 12160 Data Transmissions
24(H) 12180 Data Transmissions
25(V) 11535 South-American beamed transponder
26(H) 11535 South-American beamed transponder
27(V) 11655 South-American beamed transponder
28(H) 11655 South-American beamed transponder

SES Americom Americom-1

Ku-Band - 103 degrees West longitude

1(H) 11720 Data Transmissions
2(V) 11740 Data Transmissions
3(H) 11760 NBC Network (digital)
4(V) 11780 Data Transmissions
5(H) 11800 Data Transmissions
6(V) 11820 Data Transmissions / Kentucky Educational Television (digital)
7(H) 11840 NBC Network (digital)
8(V) 11860 Data Transmissions
9(H) 11880 NBC Network (digital)
10(V) 11900 Data Transmissions
11(H) 11920 (none)
12(V) 11940 Microspace Velocity (digital)
13(H) 11960 Data Transmissions
14(V) 11980 Data Transmissions
15(H) 12000 NBC Network HDTV transmissions (digital)
16(V) 12020 Data Transmissions
17(H) 12040 NBC Satellite Newsgathering (digital)
18(V) 12060 Data Transmissions
19(H) 12080 NBC Satellite Newsgathering (digital)
20(V) 12100 Occasional video
21(H) 12120 NBC Satellite Newsgathering (digital)
22(V) 12140 Microspace Velocity (digital)
23(H) 12160 NBC Satellite Newsgathering (digital)
24(V) 12180 FedEx Business Television (digital)

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Looking for Lowfers

The lower limit of the navigation beacon band is 190 kHz. The Longwave world changes dramatically as you go below this point. Here, you will find a mix of military RTTY stations, time signals (such as WWVB), the Russian Alpha system, and even sounds generated by the earth itself. To kick off the new year, we're going to explore the territory *just* below 190 kHz, where a hardy group of experimenters known as Lowfers ply their trade. The term "Lowfer" is a loose acronym for "Low Frequency Experimental Radio Station" and was coined by the late Ken Cornell (W2IMB), a pioneer on the band.

Under Part 15 of the FCC rules, U.S. experimenters are allowed to transmit license-free from 160 to 190 kHz (1750 meters) provided the following conditions are met: (1) Maximum transmitter input power does not exceed 1 watt, (2) the antenna length does not exceed 15 meters/50 feet, including the feedline, and (3) any out-of-band emissions are attenuated by at least 20 dB. Virtually any transmission mode can be used provided these rules are followed. Similar rules exist in Canada and some other countries. With the low-noise conditions of winter now upon us, this is an excellent time to look for Lowfer signals.

Receiving Tips

First off, don't expect to hear a Lowfer right away. These stations are operating under very restrictive conditions and you'll need to optimize your receiving setup for the best chance at hearing them. Even with everything in peak condition, it may take several tries before you can claim success.

A good antenna is crucial. I heard my first Lowfer on a "random wire" antenna, but that was over 20 years ago in a rural setting with few interfering signals. Today, the noise floor in most areas has risen considerably, as scores of electrical devices have been placed in service. Your best bet is to use a high performance antenna specifically designed for LF, such as a loop or active antenna. One longtime source for quality antennas is LF Engineering Co., of East Haven, CT (mail). You can visit them online at: **http://www.lfengineering.com**.

Use a narrow bandwidth setting on your receiver (1 kHz or less) for best results. This limits the effects of adjacent signals and allows you to concentrate on a desired signal. Headphones, too, will help to block out household noises and let you focus on the signals at hand.

Tune slowly! This cannot be over-emphasized. It's easy to tune right past a weak signal without even realizing it was there. It should take you several minutes to scan the 160 to 190 kHz range. Anything faster puts you at risk for missing faint signals that may be present.

QRSS Spoken Here

In recent years, a number of Lowfer operators have turned to a computer-assisted modes to get their weak signals through. These modes include Jason, Wolf, BPSK, and QRSS. A full discussion of these modes is beyond the scope of this article, but you will find detailed information on the LWCA website mentioned at the end of this column.

QRSS is given some attention here, as it is perhaps the most popular of the digital modes, and is rapidly emerging as a standard for 160-190 kHz work. QRSS involves sending Morse Code at extremely slow rates. So slow, in fact, that it can take 30-seconds or more to send a single "dit!" The mode trades in transmission speed for bandwidth. By sending signals at extremely slow rates, the bandwidth can be dramatically reduced on the receiving end, which, in turn, provides an effective increase in the signal-to-noise ratio. Because most Lowfer signals consist of short beacon-style transmissions (repetitive data), QRSS has become a favorite mode for weak signal exchange.

What do you need to get started with QRSS? A stable receiver, a PC, and QRSS viewer software will put you in business. One very popular software program is known as "Argo" and it can be downloaded from **http://www.qsl.net/padan/argo/**. You will also find links to tutorial information about QRSS at this site. In addition, the July '03 issue of *Below 500 kHz* explored QRSS reception in detail. Back issues or reprints are available – see the information at the front of the magazine.

If you get started in the digital modes, don't forget to check the 135.7-137.8 kHz "sliver" band for activity, as well. A number of U.S. and Canadian stations are active on the band under experimental permits, and QRSS is commonly used there.

Who's on the Air?

Table 1 is a listing of Lowfer stations believed to be active at this writing. As you can see from the chart, a fair number of stations still use conventional Morse Code (CW) at least on a limited basis, so don't despair if you're not ready to make the jump into QRSS or other digital modes. One station, interestingly, transmits music a large portion of the day!

Learning More

Additional Lowfer news and technical topics can be found in *The Lowdown*, journal of the Longwave Club of America (LWCA). Membership in the LWCA and a one-year subscription to the *Lowdown* costs $18 in the United States, $20 in Canada, and $26 by airmail delivery overseas. Payment must be in U.S. funds. For inquiries or to request membership, write the LWCA at: 45 Wildflower Road, Dept. MT, Levittown, PA 19057. You can also visit the LWCA member's site at **http://www.lwca.org.**

That's it for January. Happy New Year to all, and be sure to drop me a line with what you are hearing in 2004.

Table 1. Selected Lowfer Stations

FREQ	ID	LOCATION	REMARKS
164.900	KLFB	SUNNYVALE, CA	MUSIC 7AM-9PM, TONE AT OTHER TIMES
165.013	HS	MONROE, CT	CW
166.500	WC2XSR	VARIOUS	PART 5 EXP. STATION; 400W; VARIOUS MODES
166.666	WA	ANDOVER, MA	QRSS30
169.863	R	DURANT, OK	CW
171.200	YTN	MINNEOLA, FL	QRSS30
175.000	D	DES MOINES, IA	CW
181.167	IZJ	SAN GABRIEL, CA	CW
182.200	BRO	DULUTH, MN	PREDOMINANTLY QRSS60
183.496	PLI	BURBANK, CA	CW
183.544	MEL	SAN JOSE, CA	CW
183.610	IHX	OLEAN, NY	CW
184.600	JJX	GARDEN CITY, NY	CW
185.000	WMT	WESTFIELD, MA	CW, AM
185.185	FAW	RIVERTON, UT	QRSS30 WITH CW ID
185.298	USA	HARWINTON, CT	CW & QRSS30
185.299	NC	STANFIELD, NC	FSK QRSS AND OTHER MODES
185.3004	IP	AGRICOLA, MS	QRSS30
185.301	VD	BURLINGTON, CT	QRSS30
185.301	TMO	PITTSFIELD, NY	QRSS30
185.3026	WE	ST FRANCIS, MN	QRSS30 WITH CW ID
185.400	UWL	GLENPOOL, OK	CW
185.500	RED	WAUSA, FL	BPSK, CW & QRSS (3-60 SECOND)
185.800	TAG	HOLDEN, MA	QRSS, PSKAM10, WOLF, JASON
185.900	COV	S. COFFEYVILLE, OK	CW
185.970	YK	EVANSVILLE, IN	QRSS30
186.375	BA	LANCASTER, IL	CW
186.920	RB	FREEPORT, IL	CW
186.94	BOB	MAHOMET, IL	CW
187.460	BK	SHELL LAKE, WI	CW/BPSK MS100 ET1
187.500	BL	XENIA, OH	CW
187.500	YD	WHITE CITY, FL	CW/QRSS3
188.000	PHR	SAN ANTONIO, TX	CW
188.7	WI	AIKEN, SC	CW
188.8	GNB	HAGERMAN, NM	CW
189.278	TH	COLTS NECK, NJ	CW
189.655	NWNJ	HAINESVILLE, NJ	CW
189.800	RM	DULUTH, MN	QRSS30 WITH CW ID

ON THE HAM BANDS

THE FUNDAMENTALS OF AMATEUR RADIO

T.J. "Skip" Arey, N2EI
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Happy New Year

Well here we are into another year. The Solar Cycle is winding down, but still has plenty of life left in it from what I can see by my logbook. It's also time to give some thought to those New Year's resolutions I tend to bring up every year. You regulars know what I am talking about, but let us review for all those folks who have just come into the conversation since last January.

1) If I do not have an Amateur Radio license I will get licensed this year.
2) If I do have a license I will upgrade it to the next highest license until I am an Extra class.
3) If I am an Extra class I will find somebody who isn't licensed and help them get licensed.
4) I will repeat number 3 until I force the FCC to create more amateur bandwidth.

And now... This year's special challenge:

5) I will take my Amateur Radio experience one step further away from my shack.

I have always found that one of the most exhilarating things to do is to try something new... especially if it involves learning something new along the way. Opportunities to have such experiences are everywhere in ham radio. Taking the ham hobby beyond the shack is probably the easiest way to go after these experiences. It also performs the function of putting you (and the hobby) right in the path of non-hams. Very often, a few minutes of conversation and demonstration will turn a non-ham into a soon-to-be-ham. Growing the ranks of ham radio fits right in with a few of those earlier resolution points.

Now this "taking radio into the streets" deal doesn't need to be any more complicated (or expensive) than you feel you can handle. Let's work our way up from the sublime to the ridiculous as we look at how you can live up to this year's challenge.

When was the last time you took your handi-talkie out for a walk?

For many folks the first step to getting radio out of the shack and into the street is as simple as...well...taking their radio out of the shack and into the streets. Most hams these days begin their amateur radio experience with a 2 meter or dual band handi-talkie. The whole point of a portable radio is to take it portable from time to time.

Many folks – ham radio ops and others – also make New Year's Resolutions to do something to get fit. For most folks who are cleared by their doctors, walking is a great way to start on this path to fitness. Well, once you have covered the same ground a time or two, walking can get a bit boring. So any ham can break this boredom cycle by bringing along their handheld and talking to their friends while they are covering all that ground. Also, if you have not yet joined the legions of cellular radio users out there (never forget that a cell phone is a radio) or are out of cellular radio coverage on your walks, that 2 meter handi-talkie can be a really good companion if you run into any problems.

It's never too early to start planning for field day

Not every ham has the equipment to take a station out to a remote location and set up an operation. But there is still no excuse for not getting your hobby out of the shack, at least once a year. It is very easy to get together with a bunch of folks who do have the gear and join in the fun.

I participated in two annual ARRL Field Days before I owned any personal HF gear. It was at those first few Field Days, when I barely knew which end of the key to press that I got some of my best "Elmering" from folks who were happy to see an enthusiastic newcomer in their midst.

Field Day is also a great opportunity to try out new modes, bands, and equipment. If you are not already a member of a local amateur radio club, now is a good time to get involved. For most clubs that take Field Day seriously, planning starts very soon. Join up and jump in with both feet. Many hands make easy work, especially when it comes to putting up those antennas.

If you happen to be well versed in one of the areas of the hobby that provides bonus points – such as alternate power, special modes or even public relations – make sure you let the crew know you can share these skills. For example, I am always good for the alternate power bonus with my clubs. I should put "Have Battery Pack Will Travel" on my QSL cards.

Special event stations

Another opportunity to pool resources with other hams to get into the field can be a Special Event Station. This is really easier than you might think. The basic idea is:

1) Find a Celebration of something. (Just about anything will do).
2) Take some ham gear to the Celebration and operate in honor of that same Celebration.

There are no strict rules about power and such compared to Field Day. As a matter of fact, other than abiding by the day in day out FCC regulations and common sense safety, you can do as you please.

When I look over the Special Event QSLs in my collection I see people celebrating everything from Ground Hog's Day to Harry Truman's Birthplace and all kinds of things in between. Let your

Taking Amateur Radio to An Island Location is a Great Way to Get Out of the Shack.

imagination run wild. How about a Special Event Station to go along with your ARES/RACES support of a Walk-a-Thon or Bike-a-Thon?

Once you have figured out the event and worked out the logistics with your club or even just a couple of fellow hams, you simply need to publicize the event in the Amateur Radio Press (*QST, CQ*, ham related Web sites) and show up on the day(s) of operation. If you remember to ask people to send an SASE along with their QSL card, your only additional expense is the printing of cards or certificates. A simple Special Event operation is well within the means of most healthy ham clubs.

Further, I have yet to participate in a Special Event related to a public activity that did not generate one or two folks who had interest in becoming hams. Old Uncle Skip's personal introduction to his local ham club, The West Jersey Radio Amateurs, came about when they operated a Special Event Station offering to send holiday messages by radio at a local shopping mall. I was at their next meeting and I joined their next Novice class. Come to think of it, a good Special Event operation could clear you of any responsibility to Uncle Skip's New Year's Resolution list for years to come.

❖ Going it alone

In the last year or so I have re-discovered another hobby (read that, obsession). I am into serious bicycle riding, on and off road. On my road bike I sling my dual bander in a PowerPort GearHarness and talk to my buddies on the local repeater systems while I pour on the miles.

My other set-up is to take my mountain bike, Elecraft K1, battery and some wire antennas out as far as I feel like pedaling into the New Jersey Pine Barrens to fight off ticks with key clicks. I get my exercise, see some great sights, enjoy a few adrenaline rushes as I ride and also relax playing radio.

By carrying my gear on a bike (sort of the mechanical equivalent of a pack mule) I do not have to be as rabid about weight load as if I was backpacking. I can easily carry a more robust battery and larger antennas and coax. So many of the newer rigs lend themselves to just this type of activity, such as the Yaesu FT-817, the Icom IC-703 and, of course the Elecraft K1 and K2.

You don't have to wander out into the boondocks if that is not your cup of tea. Why not ride your bike down to your local park and find a nice bench to set up at? Enjoy the local flora and fauna while working the world. My plan to resolve this year's resolution is to do a whole lot more solo field operations this year now that I have the system dialed in.

❖ No man is an island

Those of us that have the opportunity to vacation along the coastlines of our great country can find a way to operate that can make them quite popular to a large group of hams. The Islands On The Air (IOTA) program assigns particular numbers to all of the world's islands. There are dedicated IOTA hams who are determined to collect them all, and once you are in a position to throw your call out from an island location you will be surprised to hear how many folks are glad to know you are there. Be on the right island at the right time and you can generate quite a pileup.

I've operated IOTA NA-067 from the Outer Banks of North Carolina and IOTA NA-111 from Long Beach Island New Jersey. Next time you are planning a family vacation that will take you to an island location, plan to take some simple HF gear along and you can extend your adventure in amateur radio.

❖ DXpeditions

Now this is the pinnacle of the amateur radio "outside" experience. The logistics, cost and even potential danger of taking ham radio to a foreign nation is well beyond the reach of the majority of hams. Still, small groups and even individuals pop up on the bands with regularity from extremely remote locations, generating gigantic pileups at the sound of their call.

There is one theoretically easy way to get into this DXpedition game. If you happen to be employed in an occupation that takes you to other countries, most of the logistical issues are worked out. All that is left is to find out how to obtain local licensing and how to bring your gear into the country.

The other way to play this game is to find a number of equally intent hams and form a fellowship that pools its resources to get to and operate from whatever location you can afford to go to. From the point of view of one on the outside looking in, it seems that once you have figured out how to do this, you gain enough experience to repeat it as often as you can muster the resources.

Any number of DX groups do just this, essentially taking their annual holidays in remote locations playing radio. I'm not sure my spouse would ever put up with this but if I ever got the chance to join in on a DXpedition I'd probably go for it. After all, that goes right along with what I said earlier about the most exhilarating thing to do is to try something new... especially if it involves learning something new along the way. For now, though, my bank account is limited to long rides in the woods and the occasional trip to the seashore... and dreaming.

So make this the year you take ham radio a little further from home. Have fun. I'll see you on the bottom end of 40 meters.

UNCLE SKIP'S CONTEST CORNER

ARRL RTTY Roundup
Jan 3 1800 UTC - Jan 4 2400 UTC

Hunting Lions in the Air
Jan 10 0000 UTC - Jan 11 2400 UTC

North American QSO Party (CW)
Jan 10 1800 UTC - Jan 11 0600 UTC

MI QRP January Contest (CW)
Jan 17 1200UTC - Jan 18 2359 UTC

North American QSO Party (SSB)
Jan 17 1800 UTC – Jan 18 0600 UTC

ARRL January VHF Sweepstakes
Jan 17 1900 UTC – Jan 19 0400 UTC

CQ 160-Meter Contest (CW)
Jan 24 2200 UTC – Jan 25 1600 UTC

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An Omnidirectional Scanner Antenna

If you're interested in scanning only for local signals, then a very simple antenna should get the job done for you. The telescoping whip antenna which came with the scanner may give you what you want to hear. If no antenna came with your scanner then a couple of feet of any kind of wire strung up vertically from the scanner will often bring in the stations you want.

But, for weaker signals you may want an antenna with more gain and a more appropriate reception pattern. As you may recall from past *Antenna Topics* columns, increased gain, by itself, usually has little effect on quality of reception for HF and lower frequencies. However at VHF and higher frequencies, increased antenna gain usually results in improved weak-signal reception.

❖ A Good Omnidirectional Antenna

The quarterwave groundplane antenna is the most common vertical antenna used at VHF-UHF, and it's a highly respected antenna. Using a vertical halfwave antenna, such as the J-pole discussed below, gives a bit more gain than is obtained with quarterwave designs. But, more importantly, the halfwave element concentrates the antenna's reception pattern more toward the horizon. And, on VHF and UHF, unless we are monitoring aircraft or spacecraft, this low vertical-angle pattern generally favors the angle from which the signals we want to hear are coming.

❖ Let's Make a J-pole Antenna

Using the equations given below, calculate the dimensions of your antenna for the center of the band you wish to cover. In the equations "F (MHz)" is frequency in megahertz, and letter designations refer to the drawing of the antenna in fig. 1.

A: 3/4 wavelength (in) = 8424/F (MHz) (cm), 21,397/F (MHz)
B: 1/4 wavelength (in) = 2808/F (MHz) cm 7,132/F (MHz)
C: spacing = 1 in (2.54 cm) for all bands.
D: feedpoint height above the bottom of the "J" (in) = 276/F (MHz)
In centimeters: 701/F (MHz)
E: any length. This is for mounting the antenna, and two feet (.6 m) usually allows a good solid mounting.

If you want your antenna to perform its best in your environment, you should probably adjust its feedpoint impedance for minimum SWR. To do this, don't solder the coax connector on until after you have done this test. Instead, connect short flexible leads to the coax connector, and attach them to the J-pole pipes by small hose clamps. This allows you to slide the connections up or down the pipes to get the best match to your antenna. Mount the antenna in its operating location just as it will be set up when you use it for reception. Then, when you have determined where the coax connector makes the best match, then solder at that point on the pipe.

Determine the lengths of pipe you will need. Use1/2 in (outside diameter) rigid, copper water pipe. You will also need a T-fitting, an elbow, and two end caps. Cut the pipe to produce the dimensions required by the equations. A tubing cutter is good for this, but a hack saw will work, too.

Then assemble everything into the shape shown in the figure. Now, in preparation for soldering, disassemble the antenna, and use fine sandpaper or steel wool on the surfaces to be joined. These surfaces are the outside of the end of the pipe pieces, and inside the ends of the fittings. Make these surfaces

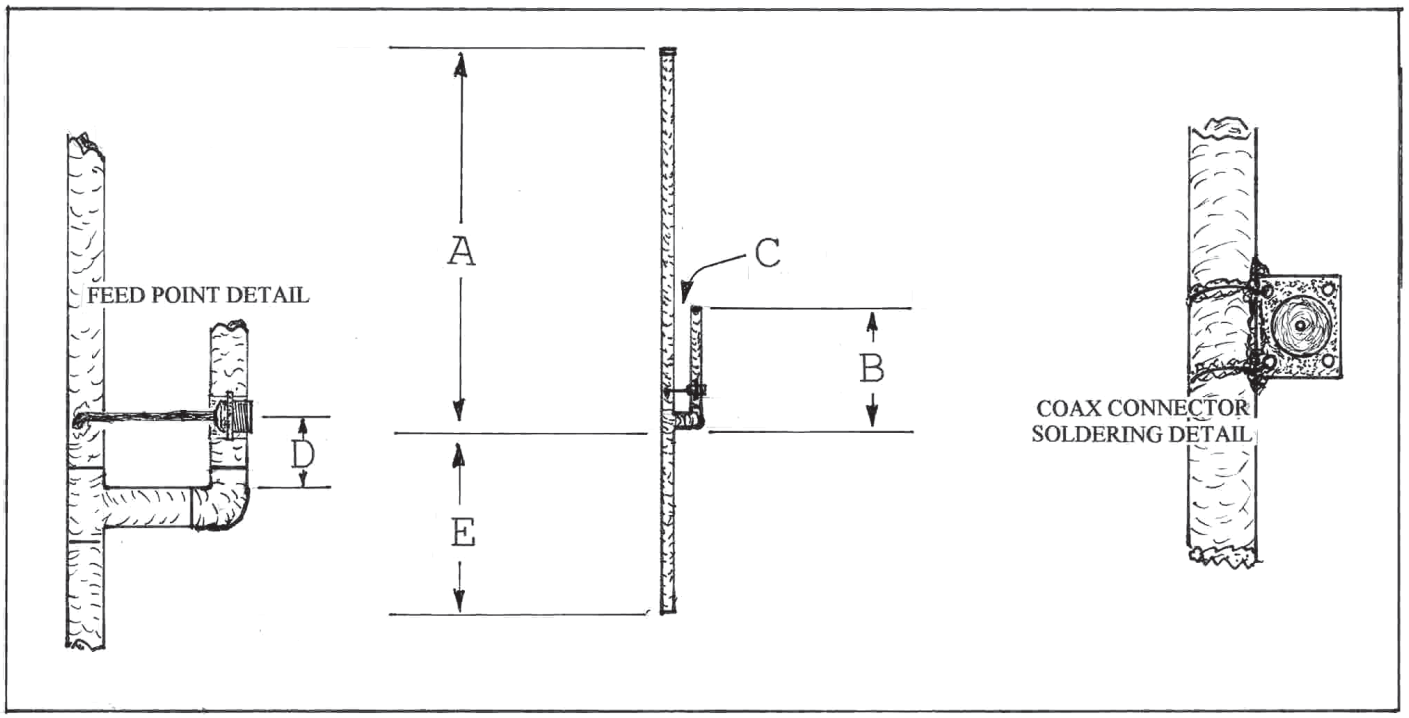


Fig 1. A J-pole antenna which consists of a half wavelength radiator fed by a quarter wavelength matching feed line section.

This Month's Interesting Antenna-Related Web site:

Here's a construction article with an easy way of making a J-pole from heavy wire, and mounting it inside a PCV pipe: **http://ka1fsb.home.att.net/jpole.html**

This site offers a short, on-line antenna handbook that shows how to design some antennas for HF, VHF and UHF: **http://www.packetradio.com/ant.htm**.

bright. Next, lightly coat the surfaces to be joined with solder flux, and assemble the joint to be soldered. Use rosin-core solder, avoid acid-core solder.

Heat the joint with a propane torch. When the joint is sufficiently hot, solder is applied to the joint at the crack where the pipe and fitting join. If the heat is right, the solder will liquify, and run into the joint to make a good bond. Be careful here, because copper will hold heat a while, and it's easy to burn yourself or set things on fire with a torch.

Here's a website with more directions for cutting and soldering copper pipe. **http://www.sas.org/E-Bulletin/2003-09-19/labNotes2/body.html**

Don't solder the coax connector to the antenna until you've determined its best location as described above. When you do solder it in place, use bare copper wire to tie the connector to the pipe while it is soldered, and also to help strengthen its tie to the pipe. Solder it in place. Then solder a connecting wire from the coax center conductor to the longer element of the antenna. For both these last steps be careful not to overheat the connector; some have insulation that will melt.

Note the length of pipe "E" in fig 1. This length is for mounting the antenna on a wood or metal mast; there is no need to insulate it from the mast. If it is mounted on a grounded metal pole, that should give a measure of lightning protection. But, as with all outdoor antennas, you will still need some kind of lightning-induced protection for your receiver. The minimum here is never use the antenna when lightning is likely, and disconnect and ground the antenna when it is not in use.

Coiling several turns of the feedline and tying them in place just below the junction of the antenna's elements will help keep the antenna current on the antenna, by preventing current from flowing on the feedline. This will give a bit of lightning protection, too.

❖ Putting the J-pole to Use

Mount the antenna as high and in the clear as possible. At the VHF-UHF frequencies for which these antennas will be used it is important to use good-quality coax feedline. If you make do with used coax be sure the inner insulation on the coax is not discolored. It may still be lossy even if it looks good. If you doubt its quality try comparing its performance with that of a new line.

Although strong signals all across the VHF-UHF bands can be received to some degree on your finished antenna, it is designed for a single band. If the antenna is tuned to resonance in the environment in which it is sited then it will exhibit its maximum gain and appropriate vertical-angle patterning when it is used on the band for which it is designed.

RADIO RIDDLES

Last Month:

I said: "In the discussion this month I suggested that directionality was a valuable asset for eliminating interference, and improving reception for MF DXing. But did you notice that I didn't suggest using the popular directional beam antennas like the Yagi-Uda, cubical quad, the phased arrays, or long wire beams like the rhombic and V antennas? Also missing were the highly directional dish and corner-reflector antennas. Why were all these directional antennas left out?"

Well, the lower the frequency the longer an antenna's elements must be for resonance. And all those "left-out" antennas are resonant antennas. If designed for MF wavelengths those designs would range in size from extremely large to gigantic.

In fact, for the most part, they are impractical to impossible to build at MF frequencies. The shortest would be a 3 MHz (highest MF-band frequency) Yagi-Uda which would have elements over 150 feet in length; the longest would be a 300 kHz (lowest MF-band frequency) which would have elements in excess of 1500 feet in length! The other antennas would have dimensions equally large or larger for the rhombic, V-beam, and other long-wire designs.

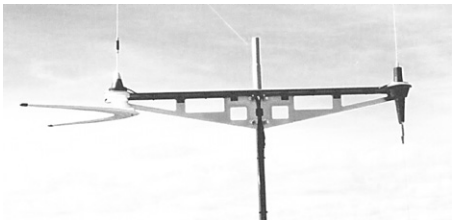
In addition, if used on the MF band, these antennas would have to be mounted at half-wavelength heights (150 ft to 1500 ft, and more) to be most effective on DX. Even for close-in work they should be mounted something like half that height. But, nicely enough, antenna size diminishes as frequency increases, and at much higher frequencies, complex designs can be made in very practical sizes. For instance, antenna elements constructed for use at the higher-frequency VHF and UHF bands, using these same "left out" designs, would range in size from about 16 feet to something like 2 inches!

This Month:

"Physical length" is length you can measure with a ruler or tape measure. The equations given for this month's antenna elements give the physical length you must make the antenna's elements. But what are the "electrical lengths" of the elements? Are they the same as the physical lengths? Or are the two kinds of lengths different, but somehow related to one another? Or is there even such a thing as electrical length?

You'll find an answer to this month's riddle, another riddle, another antenna-related web site or so, and much more, in next month's issue of *Monitoring Times*. 'Til then, Peace, DX, and 73.

MORE BOOM FOR YOUR BUCK!



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www.antennacrossarmmount.com

U.S. Patent # 6,348,899 B1

Talon Creative Inc.

Patented Technological Inventions

Marc Ellis
marcellis@monitoringtimes.com

S-40A Wrap-Up

I'm happy to be able to report, right up front, that the S-40A Restoration has been completed at last. However, this problem radio didn't give up easily before it was wrestled to the ground!

Last month began with my attempting to realign the intermediate frequency (i.f.) channel, and I was successful up to a point – except that the meter swings as I passed through resonance didn't appear to be as vigorous as I'm used to. I also noticed that there was a problem with the audio – the most obvious being that (1) it cut on suddenly as the set was warming up rather than increasing in volume gradually as is usual; (2) volume seemed low; and (3) it would distort when the sensitivity control was turned up all the way with the automatic volume control (a.v.c.) on.

Unfortunately, the work session ended prematurely when I unexpectedly found a couple of bad mica capacitors in the first audio circuit, but had no replacements on hand for them. I ordered those from Radio Daze, and found the service to be courteous and quick. Full contact details are in last month's column, but their web site is at **http://www.radiodaze.com** and their phone number is (585) 742-2020. I mistakenly gave the fax number as the phone number in the last issue.

Fixing the Audio and B.F.O.

After installation of the caps, the audio problems cleared up and the i.f. alignment peaks were a lot more crisp. Where, previously, I wasn't able to hear a thing on any band but #1 (the broadcast band), I could now hear signals on bands #2 (1680 kHz - 5.4 MHz) and #3 (5.3MHz - 15.5 MHz). However, band #4 (15.5 MHz - 44 MHz) was totally dead.

I decided to postpone troubleshooting the dead band until I had tried aligning the set's radio frequency (r.f.) and oscillator coils. That way, I would at least be able to determine if the problem band would respond to a known strong signal from my r.f. signal generator. But before starting the alignment I had to repair the beat frequency oscillator (b.f.o.), which was included in the alignment procedure.

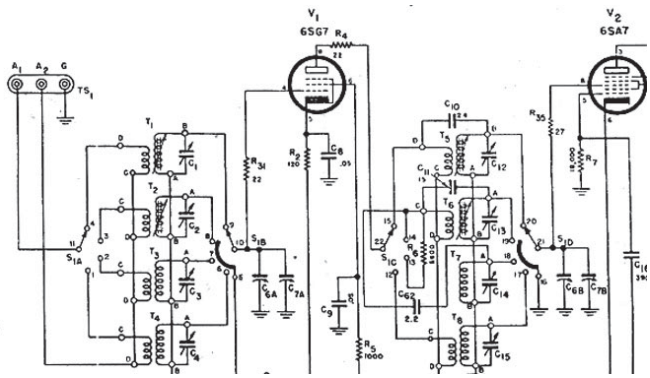
Readers who have been following the column will recall that in November I reported finding that the "gimmick" capacitor intended to couple the output of the beat frequency oscillator to the detector plates of the 6SQ7 first audio amplifier had been cut off. This capacitor had been nothing more than a couple of pieces of hookup wire twisted together. After connecting a new "gimmick," the b.f.o. came to life. Now I could go ahead with the r.f. and oscillator alignment.

Alignment Considerations

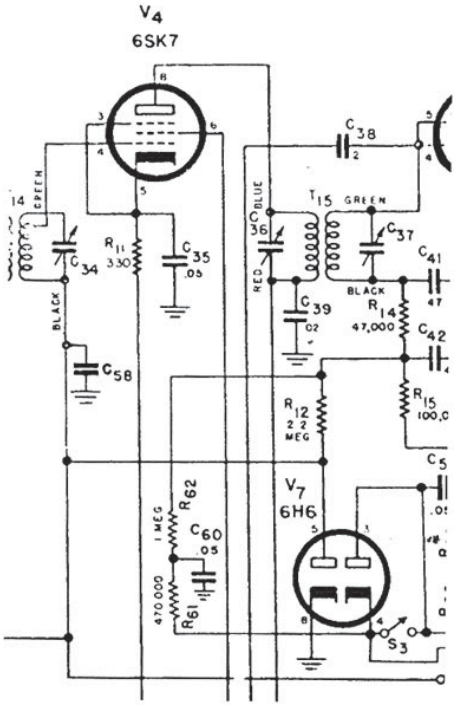
I've gone through complete alignment procedures a few different times with past projects in this column and probably will do so again, on a future project, after some time has passed. But I think I might begin to bore you if I were to talk about what is essentially the same process over and over again. I will say that since this radio has a stage of r.f. amplification, the alignment procedure is similar to that on the military "command set" receivers we restored several months ago.

First the oscillator trimmers are adjusted to set the calibration at the high end low ends of the band, then the tuned circuits at the antenna input and mixer input are peaked at the same frequencies. The service manual, or detailed owner's manual, is a *must* for this project since it specifies the test frequencies and gives the locations of all trimmers. Of course the command set receivers each cover just one band, but the S-40A has *four* bands. So the procedure described does have to repeated four different times in this receiver.

I did make one variation in the alignment procedure I've followed in these columns up to now. Previously, for simplicity, I've used an ordinary low-sensitivity a.c. voltmeter connected (through a capacitor) to the plate of the audio output tube as an output level meter. One of the problems with that setup is that the audio gain often has to be at an uncomfortably high volume to get a decent reading.



The S40-A's two sets of front-end tuned circuits. The four antenna circuits are at left; mixer input circuits are between the 6SG7 r.f. amplifier and 6SA7 oscillator/mixer tubes. Oscillator tuned circuits are not shown. The ganged bandswitch is set for Band #4.



VTVM used to monitor signal strength during alignment was connected to a.v.c. line, which begins at plate of the 6H6 duo-diode's (bottom tube's) left-hand (a.v.c. rectifier) section and runs out to the various tubes under a.v.c. control. The right-hand section of the 6H6 is used in the noise limiter circuit.

This time I used the vacuum tube voltmeter (v.t.v.m.) restored in earlier columns to measure the negative voltage on the a.v.c. line. The high sensitivity of the v.t.v.m. is required for this purpose. The stronger the signal, the higher the negative voltage –and these readings are independent of the setting of the volume control.

This is a much more elegant method and one that avoids the danger – with audio measurements – of making the signal input high enough to engage the a.v.c., thus leveling off the output readings. But in this procedure, one *wants* the a.v.c. to be engaged. Elsewhere in this article you'll find a section of the S-40A schematic showing where I hooked up the v.t.v.m.

Bands #1 - #3 responded nicely to the tweaking and really required only a minimum of adjustment. Apparently the maniac who had left

his mark all over the other parts of this radio had not, as I'd feared, gone after the trimmers with his screwdriver. However, Band #4 was definitely still dead; I wasn't able to squirt a signal through it even at the highest output of the signal generator.

❖ Troubleshooting Band #4

Normally, the test signal for oscillator and r.f. adjustments is fed to the set via an antenna terminal. I began troubleshooting by connecting the signal generator first directly to the control grid of the 6SG7 r.f. amplifier, then to the signal input grid of the 6SA7 oscillator/mixer. This bypassed the antenna and mixer tuned circuits, respectively. If there was trouble in either of these circuits, I would have been able to hear the signal generator at one of the new test points. No luck, though – still dead as a doornail.

The only logical possibility left was that there was a problem with the oscillator. The basic principle of a superheterodyne receiver is that the incoming signal is mixed with a signal generated by a local oscillator tube and separated from it by a constant amount (usually, and in this case, 455 kHz). The constancy results from the fact the tuning capacitors for the incoming signal and the oscillator are ganged on the same shaft so that they turn together.

The two signals combine to generate a difference frequency, known as the intermediate frequency or i.f. This lower, constant frequency is a lot easier to amplify efficiently than the varying frequencies being received and is the secret to the great advantage of the superheterodyne circuit.

In this receiver, as is quite common, one multifunction tube (here a 6SA7) doubles as both oscillator and mixer. If the tube does not oscillate, no intermediate frequency is generated, the signal can't pass through the i.f. channel, and the receiver is dead. To check on this, I used the little SW-54 SWL receiver restored in this column several months back. It was still in my workshop, so I turned it on, connected a short wire to its antenna terminal and draped the wire along the bottom of the 6SA7 tube socket. As expected, I found that I could hear a strong signal from the S-40A's oscillator at the appropriate frequencies on Bands #1 through #3 – but nothing on band #4.

Now I disconnected the tuned circuit assembly for Band #4's oscillator in order to isolate the coils and an associated 68 pf fixed capacitor for checking. The coils had continuity and the cap tested ok on my checker. I still hadn't found the problem.

That was when I had my light bulb. Though it had never happened to me, I knew that sometimes certain otherwise perfectly good oscillator tubes would refuse to perform at higher frequencies in communication receivers.

I got out my tube tester and rechecked the 6SA7 – which I had tested and found ok way back at the beginning of the project. My Hickock TV-7 military tester quotes a number below which the tube under test is not considered satisfactory. This tube tested right at that number, which is normally just fine because military standards are much higher than needed for most uses.

The restored S-40 is buttoned up in its cabinet once more and ready to give years of additional service.

I removed and tested the 6SA7 from my parts set. That one turned out to have several inter-element shorts and couldn't be used. Scrounging through my stash of spare tubes, I could find only two 6SA7s. One of these metal tubes was really terrible looking – quite beat up and scratched. The paint on the other one had that dull look that suggested previous heavy use. I crossed my fingers and checked it. It beat the minimum figure by about 100 percent, so I installed it in the radio and turned on the signal generator.

Voila! I was now able to tune in the signal generator on Band #4 of the S-40A. It took just a few minutes to complete the alignment for that band and I was ready to test the receiver – which I did first in the early evening using a temporary antenna running about 40 feet straight up into a tree.

❖ Reception at Last!

The results were very satisfying and, considering the amount of effort required to make this radio serviceable again, I spent quite a bit of time tuning around, enjoying the reception, and feeling pleased with myself. The broadcast band was very strong, of course. On Band #2 I was able to tune in a number of foreign stations, mostly religious, around 5 MHz as well as both sideband and c.w. signals on the Amateur 80-meter band at about 3.8 MHz. I was quite surprised to find the S-40 stable enough that I could use the b.f.o. to "decode" the sideband signals without serious drift.

I heard a number of English and foreign language broadcasters at the high and low ends of band #3 and the low end of Band #4. Tuning a little higher in the latter band there was mostly empty space, but I did hear a lone ham on c.w. in the middle of the ten-meter band at about 29 MHz.

I tested the set under daytime propagation conditions the next morning. Now there wasn't much on band #2, but Band #3 was alive with signals from end to end. I could hear sideband and c.w. signals (Morse code) on the amateur 40-meter band around 7.2 MHz. The bottom end of band #4 was also full of signals and, tuning higher, I could hear a few truckers on CB at about 27 MHz and more 10-meter hams around 29 MHz.

Was the result worth all this time and labor? Looking at it strictly as a restoration project, I'd have to say no. That was a lot of work to lavish on a not-particularly-rare low-cost shortwave set of the mid 1940s with a front-panel cosmetic problem! Yet it was a great project for our column because this "radio from hell" turned out to be a wonderful laboratory for exploring things that don't usually go wrong in a radio restoration but certainly can!

There are many important points to be learned from this project, but three come to mind immediately. First (and I think I've mentioned this before), don't embark on a receiver restoration project until you make sure either that the power transformer (if present) is ok or that you have a satisfactory replacement in hand. Second, don't assume that mica capacitors are indestructible and permanent.

Third, if you get into a receiver restoration only to find that someone before you has made a lot of cockamamie changes, put the radio aside for possible later use as a parts set (unless you are a glutton for punishment). Manufacturers make regular design changes in their products during a production run to deal with problems that you might not even be aware of. These changes may be undocumented or not included in the documents you have. You might then have a tough time assessing what's in front of you.

Bye for now! See you next month.

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New Communications Solutions NCS-3230 Multi-Rx Audio Controller

In the early 1960s, most families owned one car and monitor hobbyists had one shortwave receiver and perhaps one crystal controlled or tunable VHF monitor receiver.

Fast forward 40 years to the present. Multiple-radio monitoring stations have become commonplace for a variety of reasons.

While you can have plenty of fun using a single tabletop receiver, there are compelling reasons for employing more than one. Despite wider frequency coverage and more channels, a single receiver of today still has trouble keeping up with the proliferation of radio transmitters. The 460 and 860 MHz bands are crowded. You see people transmitting everywhere you travel.

Just count the number of walkie-talkies in use at large department stores like Target and Wal-Mart. Even the local office supply stores are equipping their staff with walkie-talkies. Movie ushers are now radio equipped. Modern police agencies employ wireless microphones in the field.

Military air monitors are perhaps the most demanding of their equipment. A single scanner is too slow to scan the vast 225 - 400 MHz region for brief transmissions, so some military buffs have several scanners, each dedicated to scanning a band fragment. Military air communications are found on shortwave frequencies below 30 MHz as well as in the 138 - 144 and 148 - 150 MHz VHF-high band.

While multiple-radio stations solve some problems, they introduce new issues. How do you share one or more antennas among multiple receivers? How can you manage the audio from a group of separate radios?

We addressed antenna sharing in the September 1997, June 1999, and January 2000 columns when we reviewed Stridsberg and Mini-Circuits antenna multicouplers (splitters). This column describes the NCS Multi-Rx, a new accessory to manage the audio output of a group of receivers.

NCS-3230 Multi-Rx

The built-in speakers found in most desktop radios provide minimalist audio quality and are usually mounted on the cabinet side, top, or bottom instead of pointed at the user. Therefore, it is common practice to use a separate, external speaker with a desktop receiver.

The NCS-3230 Multi-Rx is an accessory for controlling and mixing the audio outputs of up to six receivers or other sources and routing the audio to two external speakers or a set of stereo headphones. The Multi-Rx is manufactured in the US by New Communications Solutions, LLC of Norcross, GA. NCS maintains a web site at **http://www.ncsradio.com**.

Ordinarily, you would use a patch cable (not supplied) to connect the external speaker output of each receiver to an input on the Multi-Rx. The Multi-Rx contains its own audio amplifiers and circuitry to match the speaker-level audio inputs.

A front panel volume control adjusts the output level for all sources simultaneously. The balance control behaves as one might expect, controlling the amplitude between the left and right channels.

The Multi-Rx can function in Normal or Spatial mode. There are two pushbuttons for each of the six radios. In *Normal* mode, the top row of pushbuttons connects each radio to the left audio channel and the bottom row connects each radio to the right channel. You can route each radio's output to either the left or right channel, both channels simultaneously, or mute the radio.

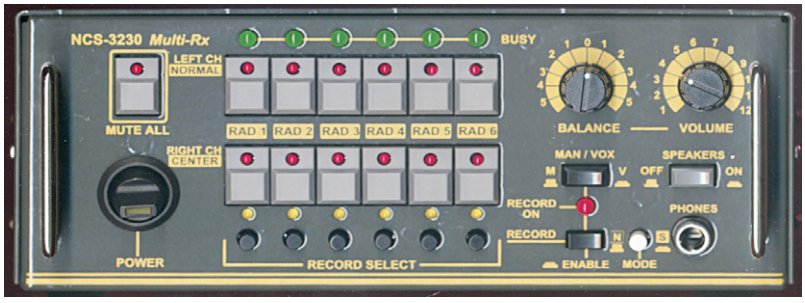
In *Spatial* mode, the audio for each radio is distributed to left and right channels in varying proportions. If you are sitting midway between the two speakers, the sound from each radio appears to emanate from a different direction. The pushbuttons perform a different function in Spatial mode. The top row of pushbuttons mutes each receiver. If you press the bottom pushbutton for a given receiver, its audio is routed equally to both left and right channels so the audio appears to emanate from the center position.

Each radio selection pushbutton is fitted with a red LED, used to indicate an audio connection. A yellow activity lamp for each radio lights when an audio signal is detected from the associated radio. The activity lamps help you determine which radio is "talking," something which can be difficult to determine when multiple radios are connected to the same speaker.

A Mute All pushbutton mutes all radios and its red LED flashes to remind you that the audio has been interrupted. We use the Mute All feature to silence the radios when receiving telephone calls.

The Multi-Rx is powered by 12 VDC and an AC operated wall wart power supply is included.

The Multi-Rx's sound detection circuit can control a tape recorder via a jack on the rear panel. There is a pushbutton for each of the six radios so you can selectively record from any combination of the selected receivers. There is a fixed 5 second post transmission delay so the recorder continues to record for a few seconds after each transmission.



Line Levels

The Multi-Rx accepts audio at speaker-level voltages, but it provides access to left and right line level signals for accessories which require lower audio voltages.

The Multi-Rx does not have tone controls (e.g., bass, treble), so you can connect your own external audio equalizer using the line level jacks. Likewise, you can insert a digital signal processor or audio compressor accessory into the line loop circuit.

Data Connector

A 9-pin connector on the rear panel can be used either for Selective Muting or for remote interface with a computer.

Selective Muting permits control voltages to mute selected radios. You might use this function if one of the radios is a transceiver and you want to silence the radios when you transmit. In this configuration, the transceiver's push-to-talk circuit would be connected to the Multi-Rx's rear panel Mute jack. We think a clever experimenter might be able interface the Mute jack to a priority scanner in a way that silences the other scanners when the priority scanner is "talking."

Computer control requires that the Multi-Rx be equipped with an optional NCS-8432 module which converts RS-232 voltage levels to TTL/CMOS levels. The Multi-Rx sends switch status information to the computer when it is queried or when the user changes a switch on the front panel.

The computer can also activate the 12 audio source switches remotely. The computer interface commands are documented in the Multi-Rx instruction manual.

Performance

The Multi-Rx is built better than many of the scanners you can connect to it. It is fully enclosed in a metal cabinet and has a metal front panel. Large rubber feet prevent tabletop marring.

Most modern scanners and many shortwave receivers employ a 1/8 inch miniature phone jack for external speaker. The Multi-Rx uses female RCA-style phono jacks for audio connections. Patch cables are available from NCS and are described at their web site.

Our Multi-Rx's audio distorted when we increased the input level too far. According to an NCS representative, the company has incorporated a fix for this problem in later units.

A 5 second trailing VOX recording delay is too long. It will cause a 5 second gap of blank tape after each transmission. Most scanner transmissions are only about 5 seconds long so half the tape will be blank. A one second delay works better for scanning.

According to Doug McDowell of NCS, you can alter the Multi-Rx recording delay by replacing resistor R26, which is normally 100 Kohms, with a lower value. As he points out, it would be easier to solder another resistor in parallel with R26.

The Multi-Rx is furnished with a block diagram and a full schematic diagram may be downloaded from **http://www.ncsradio.com/schematics/3230.pdf**

I like the NCS-3230's generous use of LEDs to indicate status, but all the audio source lamps are green color. Using distinct colors would provide a better visual cue indicating which receiver is active.

It's gratifying to see radio products made in the USA with an open architecture – where the schematic and computer interface commands are openly documented and freely available.

NCS-3230 Multi Rx
Serial number H31C 242
Price: $349.95 list

New Communications Solutions
5364 Valley Mist Trace
Suite 101
Norcross, GA 30092

tel: 888-883-5788
email: support@ncsradio.com
web site: http://www.ncsradio.com

❖ Yaesu VR-5000 Hint

We reviewed the Yaesu VR-5000 receiver in May 2001 and observed that the operating manual omits important information.

A reader sent us the following procedure detailing how to restore a frequency which has been skipped during a PMS scan.

To undelete a PMS skipped frequency:

1. Activate pms mode
2. Switch to PMS bank that has the skipped frequency you want to restore.
3. Press (f), then PMS set
4. Scroll to misc, then enter
5. Scroll to skip, then enter
6. Scroll to the skipped frequency, then press beep / .
7. Scroll to end, then enter
8. Scroll to write, then enter

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Outer Limits continued from page 69

❖ QSLing Pirates

Reception reports to pirate stations require three first class stamps for USA maildrops or $2 US to foreign locations. Letters go to these addresses, identified above in parentheses: PO Box 1, Belfast, NY 14895; PO Box 28413, Providence, RI 02908; PO Box 69, Elkhorn, NE 68022; and PO Box 2702, 6049 ZG Herten, Netherlands.

Some pirates prefer e-mail, bulletin logs or internet web site reports instead. The best bulletins for sending pirate loggings: *The ACE* ($2 US for sample copies via the Belfast address above) and the e-mailed *Free Radio Weekly* newsletter, still free to contributors via *niel@ican.net*. The *Free Radio Network* web site, is found at **http://www.frn.net** on the internet.

❖ Thanks

Your loggings and news about unlicensed broadcasting stations are always welcome via 7540 Highway 64 W, Brasstown, NC 28902, or the e-mail address atop the column. We thank this month's valuable contributors: John T. Arthur, Belfast, NY; Dave Balint, Wooster, OH; Kirk Baxter, North Canton, OH; Artie Bigley, Columbus, OH; Cachito, Santiago, Chile; Ross Comeau, Andover, MA; Rudy Elsen, Castro Valley, CA; Nicolas Eramo, Villa Lynch, Argentina; Harold Frodge, Midland, MI; William Hassig, Mount Prospect, IL; Mike Hearn, CA; Harry Helms, Las Vegas, NV; Richard Kramer, Reading, PA; Chris Lobdell, Stoneham, MA; Greg Majewski, Oakdale, CT; Larry Magne, Penn's Park, PA; Bill McClintock, Wellington, OH; Mark Morgan, Cincinnati, OH; Mike Prindle, New Suffolk, NY; Lee Reynolds, Lempster, NH; Fred Roberts, Hamburg, Germany; Robert Ross, London, Ontario; Martin Schoech, Merseburg, Germany; John Sedlacek, Omaha, NE; Bud Stacey, Setsuma, AL; Ronnie Stroup, Wooster, OH; Jim Thomas, Milliken, CO; Niel Wolfish, Toronto, Ontario; and Mike Wolfson, Ashland, OH.

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Hands-On DRM Monitoring - Part 3

Last month in Part 2 of our DRM story we finished our summary of the digital data structure of a DRM signal. Then I teased you with our first successfully received DRM screen using Ten-Tec's RX-320D receiver and Merlin DRM software. This time we will dig right into the nuts and bolts of monitoring a DRM signal.

❖ Hardware Needs

First you need a receiver with a 12 kHz output. You already may own one and not know it.

Modifications

As we saw last time, Figure 1 shows that the DRM signal is received by a radio front-end with a 12 kHz output. If you are talented enough and brave enough, you may be able to modify your current shortwave receiver by adding a 455 kHz to 12 kHz adapter circuit. The DRM site **http://www.drmrx.org/receiver_mods.html** lists a number of commonly used commercial receivers and corresponding DRM capable modifications.

ICOM IC756
Kenwood R1000
Grundig Yacht Boy 400
JRC NRD 525
Yaesu FRG-100
Yaesu FRG-8800
AKD Target HF3
AOR 7030
Sony ICF-SW77
AR 3030
Sangean ATS-803A
Lowe HF225
Ten Tec RX350

Add-On Board

If you are into soldering irons, another way to go is to build a small printed circuit board (PCB) that converts your radio's existing 455kHz intermediate frequency output into the 12 kHz required by the DRM software. A PCB is available from a number of sources. Try looking on **http://home.t-online.de/home/sat-service/sat/DRM/DRM.html** This is a very interesting site with lots of DRM receiver modifications. This site states that the Grundig Yacht Boy 4000 and the NASA HF4E are *not* suitable for DRM reception.

DRM-Ready

If you decide not to go the modification route, off-the-self DRM capable receivers are available. The Ten-Tec RX-320 now comes in a "D" version indicating that it is Digital ready with a 12 kHz output on its rear panel.

The RX-320 was first introduced to *MT* readers over five years ago with a number of in-depth articles right here in *Computers & Radios*! But due to the fact my RX-320 was one of the first off the production line it did not have the 12 kHz output.

If you are in my situation, do not despair. Ten-Tec will upgrade your RX-320 to a "D" for a fee. Check the Ten-Tec website **http://www.tentec.com** for exact details and costs. I believe it is around $50 including return shipping. But check it for the latest info. We'll get back to the RX-320D in a second.

The WR-G303i is Winradio's answer to DRM. The WR-G303i is the latest in the family, which began with the immortal WR-1000 many years ago. Guess where the WR1000i was first introduced to the monitoring world many years ago? If you said the *Computers & Radios* column you are showing your superior knowledge radio technology (and your age)!

The G303I is a PC card radio, which installs inside your computer. Check the Winradio website at **http://www.winradio.com/home/g303i.html** for detailed information on the G303i and the soon to be released DRM software demodulator.

A number of companies are working on standalone DRM radios. These will be able to demodulate DRM without the need for a computer. Mayah Communications **http://www.mayah.com/drm** announced their DRM Receiver 2010 for release late 2003.

This is a portable radio with analog LW, AM, SW and FM capabilities as well as DRM. It is projected to utilize an internal DSP (digital signal processing) "brain" whose DRM decoding software can reprogrammed using a PC's USB port. That USB stands for universal serial bus, not upper side band. Now let's see how long it really takes for these standalone DRM radios to hit the consumer market at affordable prices.

❖ Monitoring DRM

Last month we took a quick look at the problems and rewards which I encountered trying to demodulate DRM using an RX-320D and the official DRM software from Merlin and a PC. The only cable is between the 12 kHz receiver output and the soundcard input of the PC as illustrated in Figure 1, from the DRM software manual.

If you recall, I had a very frustrating few days where I could detect that a DRM signal from Radio Canada International was present but my laptop computer just sat there and did nothing!!

This problem (most likely) turned out to be associated with the sound card in my laptop. The DRM software says it requires a soundcard with a sampling rate of 48 kHz. I checked with Fujitsu and was told that my system complied with this requirement.

However, I could not receive DRM until I changed to a different computer. It should be noted that my Fujitsu Lifebook is not on the DRM software's unsuitable list. The manual suggests that the AGC (automatic gain control) or auto boost function of the soundcard may be the culprit. I tried every conceivable setting of my laptop's soundcard to no avail.

Does the LCD scan rate circuit somehow interfere with the 12 kHz DRM signal? Has anybody used a laptop to decode DRM? If so email me so I can sleep at night.

My Fujitsu Lifebook laptop is not alone in this problem since the DRM software manual (drm_sw_radio_manual_10.PDF) lists a number of soundcards/systems, which have been shown by testing to be unsuitable for DRM demodulation. The manual also lists systems/soundcards that have successfully demodulated DRM.

❖ A Working DRM System

I moved the DRM software to a Pentium III, 500 MHz computer using a Philips Soundcard and tried again the next day when RCI came on

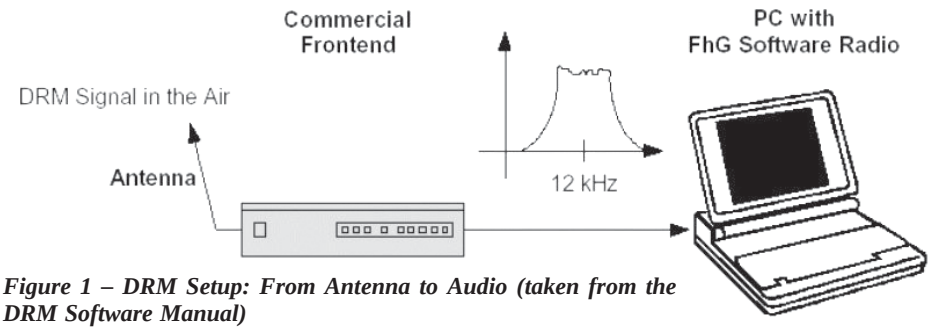

Figure 1 – DRM Setup: From Antenna to Audio (taken from the DRM Software Manual)

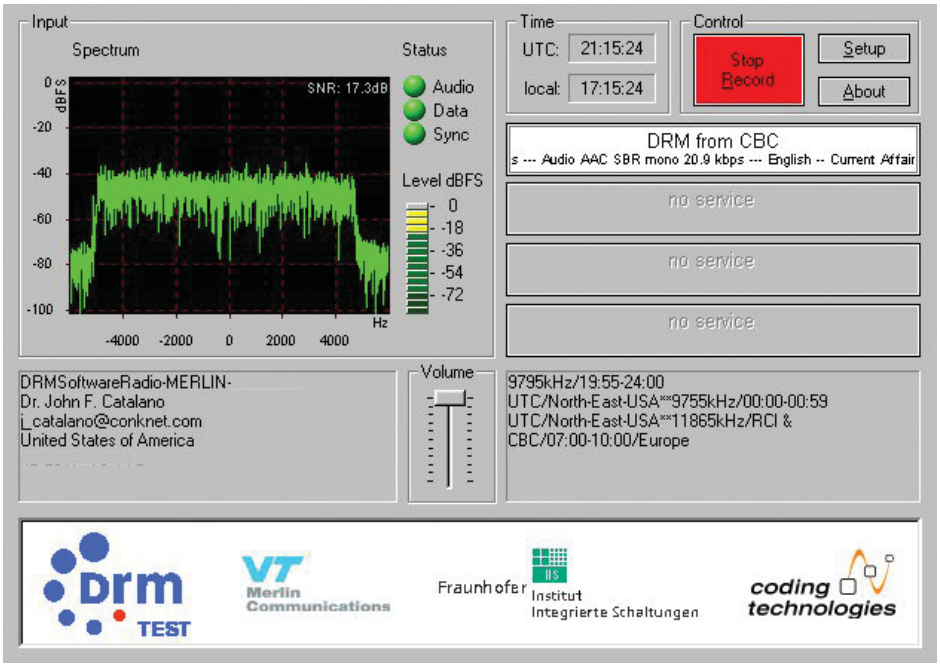

Figure 2 – Eureka! DRM Software Screen Receiving Canada Broadcasting Corporation's Radio Canada International Current Affairs Program

the air. Still no joy. But the software was acting very differently, by showing some signs of life. The row of red indicators at the top of the screen began to flash green. The signal to noise number on the screen was fluctuating, hitting a high of 17 and low of 3. But still no DRM audio or display information. So I decided to enlist the help of some friends around the country.

I telephoned two friends with lots of monitoring experience and well equipped radio shacks. I hoped they would have DRM capability … and I was right. All had Ten-Tec radios and Merlin DRM software. So we set up a three-way telephone conversation with all radios tuned to RCI and our computers running the DRM software.

Now we had three DRM listening stations spread from New England to the Mid-Atlantic to the South, all monitoring RCI transmitting from Sackville, on Canada's East Coast. All stations were registering strong signal strengths of RCI. The New England station (me) could not "lock-in" on the DRM signal. The Mid station was receiving solid DRM. And the Southern monitor also had no "lock-in."

The results were puzzling to say the least. The Mid-Atlantic monitor telephoned yet another local DRM listener. Surprise! The fourth station, less than 5 miles from the only station that was receiving DRM, could *not* get continuous DRM copy!

As RCI ended their DRM transmission that night, the impromptu DRM listening net called it a day (or night).

❖ Perseverance Pays

Next evening I tried again. I was listening solo as the RCI transmission started. Almost immediately the screen came to life! Three green indicators. Scrolling RCI station and program identification display. See Figure 2. And then beautifully clear voices began to coming from the computer's speakers. DRM reception achieved!

The signal display of the DRM was noticeable different from the day before. If you look at Figure 2 you will see that the sides of the signal graph has distinctly sloped sides with a high plateau between them. Every other time I tried to receive DRM the graph indicated a signal of the same high level but it was straight across the whole graph. The graph is a display of the signal level (Y vertical axis) versus the frequency of the signal. The straight line high on the y axis of the graph indicated that there was signal across the whole measured spectrum, not just in the DRM data band.

❖ More Question Than Answers

This experience has left me with many questions concerning DRM monitoring. They fall into three categories that may be related: propagation, electrical noise and the computer system.

Propagation

Looking back on the results of our little DRM listening net, the varied results indicate that DRM propagation is not a simple matter. All listening stations indicated high signal levels. However, not all monitoring stations could successfully receive DRM audio/data.

The distance to transmitter did not appear to be directly related to the results. Also, a few miles of local distance seemed to effect the results dramatically; one station having perfect DRM audio and data and another having no copy. Very perplexing.

Noise

As we have seen from the specifications, the DRM digital "modulation" resides around 8 to 12 kHz. Trying to decode DRM's complex data stream is a challenge in an electrically "quiet" environment. However, there can exist many different interfering noise sources that would have a major effect on receiving DRM.

These sources can be local AM (MW) radio stations, power line utility broadcasts and home light dimmers, to name a few. Could any of these have been the culprits initially preventing me, and the other stations, from receiving DRM? Possibly.

The Computer Transmitter

One well-known radio monitor once proclaimed, "I'll never have a computer in my radio shack!" Although a bit severe in his approach, his technical sense was sound. Just about everything in a computer generates radio frequencies. It starts in the switched mode power supply that is truly a powerful radio transmitter. Today microprocessor clock speeds are in the hundreds/thousands of megahertz. Even RAM memory is clocked using signal in the hundreds of megahertz.

Although these components operate on frequencies much higher than DRM's 12 kHz, they are rich in harmonics (multiples and fractions of the original frequency) which can mix together. The result is wide band noise almost from DC to light. Could each of our DRM net listening stations' computer systems or the quality and routing of our cable between radio and computer have played a major part in our results? Yes again.

Finally, I began to consider LCD (flat panel) drive electronics used in laptops. If you have ever put a LW/MW radio next to a laptop you'll know what I'm talking about. Was this the problem I encountered with my lack of DRM success using my laptop? If anyone has successfully used a laptop for DRM, please email me so we can cross this possibility off the list.

❖ Next Time

One thing is for sure. Anyone who tells you that receiving DRM is like falling off a log hasn't fallen off many logs!

Is there any other DRM software available? Are there any newcomers to the DRM list of stations? What other features are there in the Merlin DRM software? What is my overall opinion of DRM today and its future? Next time we'll finish the DRM story by answering these questions and maybe getting some feedback from your DRM monitoring sessions. Don't trade in your analog-only receiver until you read the last part of the story.

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MT REVIEW

WiFi Plus Wideband Antennas

By Bob Grove

With the current flurry of activity in the 2.4 GHz (IEEE 802.11) spectrum for wide-bandwidth interconnecting of wireless computers, the logical emphasis is on reliable distance. Towers for wide-area, wide-bandwidth service are springing up around the countryside like quills on a porcupine.

Just how far can you separate these little laptops and still get reliable data transfer? 100 feet? 1000 feet? Wi-Fi Plus, Inc. claims to have established reliable links at distances up to 50 miles under ideal conditions.

We had an opportunity to try several of their unique antennas and were impressed by their performance. Every antenna is affixed with a standard N connector for cable interconnection.

Their stub-appearing "Ultra-M Bullet" is intended for laptops and PDAs; its virtually-spherical-radiation pattern allows it to be placed in nearly any position without compromising signal strength. Emphasis is on convenience, not distance, for this baseline model.

In our experiment, the antennas were connected alternately to an AVCOM PSA1727A spectrum analyzer for comparative measurements. Our office 2.4 GHz wireless LAN was used as one real-life source for the first measurements, and a distant wideband tower for the second.

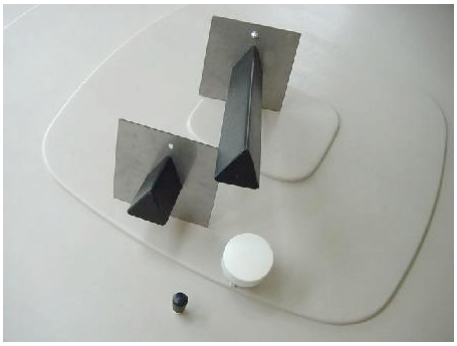
The "Ultra-M Omni"– a multi-element ground plane in a radome housing – provided a solid signal, better than the laptop-mounted whip. Advertised as a 3 dBi (approximately1 dBd), remote-mountable antenna, we used it as a standard of comparison.

Next, we tried the "Ultra-M Beam," a 4-inch directional antenna with a claimed gain of 12 dBi (approximately 10 dBd). The AVCOM spectrum analyzer verified higher gain over the Omni – signal spikes were about 5 dB higher than seen for the Omni in our field experiments.

Several experiments in location and position were conducted to test improvements over the 4-inch beam by switching to the 18-inch, which claims a 17 dBi gain, but only about 2 dB improvement was seen. We contacted the factory for their comments:

"Sometimes, especially in obstructed environments, the 4-inch Beam, with its 60 degree, half-power azimuth beamwidth, will actually capture 'Preferred (Polarization) Path' signals better than the higher gain, [but] only 40-degree-azimuth beam width, 18-inch antenna."

Indeed, at these frequencies, signal reflections and polarization angles can make a considerable difference in intercommunication effectiveness as well as apparent gain. In our tests, a left or right position movement of only an inch or two resulted in measurable signal strength changes.



Officials at WiFi-Plus informed us that the wall-mountable beams have a built-in, positive-takeoff angle in an effort to better capture tower-mounted signals.

Our Recommendations

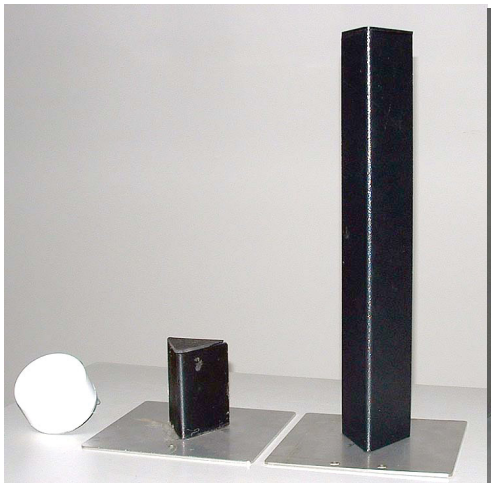
As a result of our findings, we would recommend the Ultra-M Omni for remote-mounting the antenna away from a computer and to a location where it has a better signal path for more reliable, consistent signal strengths.

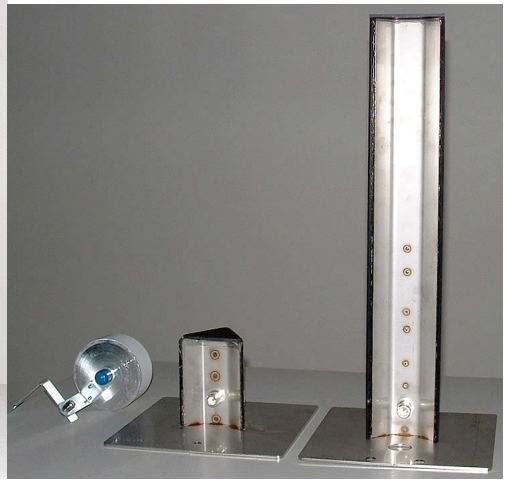
The 4-inch Ultra-M Beam proved a favorite, with measurably improved gain; use it where whips, stubs and other omni-directional antennas are unreliable.

The longer 18" beam, while exhibiting only a 2 dB gain improvement over the 4-inch model in our tests, did have remarkable directivity. We would recommend it in situation where side-lobe rejection of potential interference from co-channel users is a real issue.

All in all, we found the new WiFi Plus antennas to be effective in improving reliability in typical 2.4 GHz wideband data applications, and would expect to see a similar improvement in 2.4 GHz surveillance video applications as well.

For more information or to order any of these products, visit the WiFi Plus, Inc. web site at **http://www.wifi-plus.com**. Wifi-Plus Inc. headquarters are located at 734 Pearl Rd., Brunswick, Ohio 44212; 330-273-3665. Prices range from $44 for the laptop button antenna, $109 for the Ultra-M Omni, $189 for the 4-inch beam, $209 for the 18-inch beam, to over $600 for tower-mounted models.





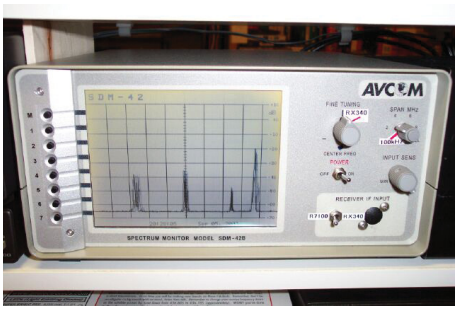
A Visit to AVCOM of Virginia

By Dino Papas KLØS

AVCOM of Virginia is a Richmond, Virginia, based company that manufactures a broad range of spectrum analyzer products and accessories targeted at the communications, surveillance, cable and satellite TV, wireless networking, and microwave equipment installation markets.

Products for the Radio Hobbyist

Several of AVCOM's products should be of interest and useful to the readers of *Monitoring Times*. These include their line of reasonably priced spectrum analyzers and frequency display units; frequency extenders; noise, sweep and tracking generators; DC voltage insertion and blocking adapters; inline RF amplifiers; and antennas.



Author's SDM-42B Spectrum Display Monitor

Having purchased a number of spectrum analyzer accessories from AVCOM for use on my electronics workbench I recently added their SDM-42B Spectrum Display Monitor to the ham/SWL operating position. As I researched spectrum display monitors from different companies, I exchanged several e-mails and got great advice from Bob Grove at Grove Enterprises, one of AVCOM's distributors.

The SDM-42B provides a frequency spectrum display of signals for both my Icom IC-R7100 VHF/UHF and Ten-Tec RX-340 HF receivers. Using a spectrum display monitor lets you identify the presence of signals by allowing you to "see" the frequency spectrum above and below the center frequency that your receiver hears.

For those readers using receivers with an available IF output at 10.7 MHz, the SDM-42 series monitor provides real-time visibility of all of the signals present within your receiver's IF band-pass and lets you quickly retune your receiver to hear the signal of interest. Note that a second internal custom IF converter is available for radios with other IF outputs or to support two receivers with different IF output frequencies.

In my case, the RX-340 IF output for use with a spectrum display monitor is at 45 MHz and the accessory converter translates that signal to 10.7 MHz.

Getting to Know AVCOM

After deciding on and purchasing the AVCOM unit and integrating it into the station, I asked Bob Grove several questions about the unit's operation and input sensitivity (Bob uses an SDM-42B at his monitoring position). He recommended that I contact the company directly which led to telephone discussions with Ken Parks, AVCOM's Sales and Marketing Manager, and Ernie Jonker, their Engineering Manager, both of whom answered all my questions enthusiastically during a lively conference call.

Ken invited me to visit and tour AVCOM and to bring my SDM unit to double-check the sensitivity issue I had raised and have the latest computer firmware installed. So, a few days later my good friend and amateur radio mentor Sam Kennedy, KT4QW, and I visited AVCOM at their Richmond facility.

Author's monitoring position with SDM-42B connected to his IC-R7100 and RX-340 receivers

Ken Parks, AVCOM's Sales and Marketing Manager

Our visit, discussions with Ken Parks and his staff and a detailed plant tour provided us with an excellent insight into this segment of the electronics test equipment industry, and a great opportunity to see how AVCOM's units are designed, prototyped, tested, and constructed almost exclusively in-house.

A Little History

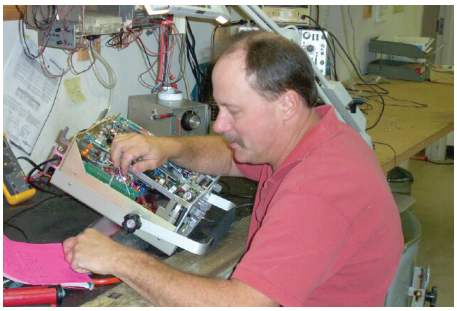
Andy Hatfield founded AVCOM in 1973 with an initial focus on rebuilding military aviation headsets for use in general aviation. The company expanded into the satellite TV market, offering a series of the first affordable direct broadcast satellite TV receivers. In the 1980s, when TV networks began scrambling their signals and satellite receiver sales declined, Andy's response was to expand into the test equipment market with the introduction of the model PSA-35A, a low cost, easy to use portable spectrum analyzer. A field technician could now make precision satellite antenna alignments easily and quickly on site.

Throughout the 1990s, AVCOM contin-

Ken and Production Supervisor Annie Anthony review units in the repair queue

ued their expansion into the satellite and microwave test equipment markets by adding an extensive line of analyzers designed and dedicated to specific frequency bands for varied uses. In 2000 AVCOM was purchased by the Pennsylvania based Bryanvon Investor Group who also owns Ramsey Electronics.

Many of the original PSA-35A units are still in field use today and enjoy a solid reputation for their performance and rugged, long-term reliability. During our visit we observed several different units in the repair queue. Ken told us that out of the thousands of instruments in the field today, AVCOM receives on average only six units per month for repair.



AVCOM Bench Technician Bob Klebert reviews work to be done on a unit returned for service

❖ AVCOM's Market Specialty

Unlike the much more expensive high-end bench top spectrum analyzers manufactured by Agilent, Advantest, Anritsu, IFR, Tektronix and others, AVCOM offers rugged, portable battery-powered instruments at a relatively low cost to the point-to-point microwave, satellite, telecommunications and high-end home theater service industries.

With the recent industry slowdown in these areas, AVCOM is again refocusing their product line. The newest market "hot-spot" is in wireless networking – not only the familiar home wireless networks that many of us now enjoy but more importantly the Wide Area Wireless Networks where commercial distributors cover a much larger and more complicated RF footprint. Installing and troubleshooting the higher power signals using highly directional antennas requires the sensitivity and precision of a dedicated spectrum analyzer.

❖ Company Best Sellers

AVCOM's model PSA-37D spectrum analyzer is currently their number one selling unit, covering the L and C satellite bands (10-1750 MHz and 3.7-4.2 GHz). In the near-term, the PSA-37D will be replaced by their new model PSA-37XP, an instrument that combines the features of the PSA-33B, PSA-37D and PSA-39B analyzers into a single unit covering the spectrum continuously from 1 MHz to 4.2 GHz. With one analyzer, the field technician will be able to observe a significant frequency range that includes the CATV IF spectrum, satellite extended L and C bands, and satellite HDTV frequency bands (and for you hams, that covers all the way up through our 3.5 GHz frequency band!).

Frequency extenders are AVCOM's number two seller. Extender units are simply frequency downconverters that allow you to view signals above those available to your existing spectrum analyzer or monitor. The frequency extender does this by a straightforward process of downconverting selected 1 GHz wide frequency segments between 1 and 6.5 GHz to fall between 0 and 1 GHz. This allows a cost-effective way to expand the capability of your current instrument.

The company also produces computer interfaces that connect many of their newer units, including the SDM-42B, to your home computer. AVCOM provides Windows based software for use with the ADA-10A and ADA-20A Analyzer Display Adapters that enables the user to view and store the spectrum display.

Machine Shop Foreman Tinh Ha completes the final assembly of a Frequency Extender Unit

❖ Hams Take a Tour

During our extensive plant tour we followed the complete manufacturing process from design, to prototyping, to PC board fabrication and wave soldering, unit construction, quality assurance testing, and the 48-hour continuous burn-in prior to shipment to the customer.

AVCOM produces their products almost entirely in house, including milling aluminum stock into cavity filters and even power cord wrapping frames. It was interesting (and refreshing!) to observe the interaction of all the staff as they worked as a team to complete the task at hand, even when working together outside their normally assigned duties.

Ken displays recently milled aluminum filter cavities

❖ Checking Out the Author's SDM

While we were there, Ken asked Scott Kelly, one of AVCOM's repair technicians, to check out what I thought to be a lack of sensitivity with my SDM-42B when using it with my IC-R7100 receiver. When tested, the unit did indeed meet the required sensitivity specification.

Production Supervisor Annie Anthony lends a hand in the final assembly of power supply units

The problem actually ended up being with the receiver, and the solution was found in my own technical information files in the form of a Bob Grove *Monitoring Times* technical note from way back in 1985. Bob's note addressed this very issue along with a recommended fix that was easily implemented. (Being an "info packrat" does pay off every once in a while!)

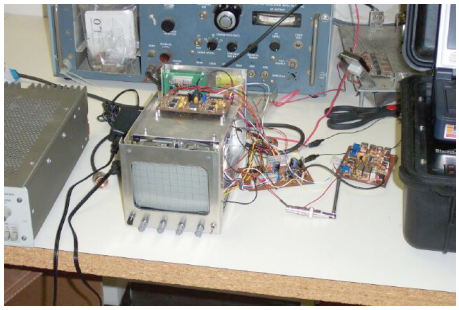
Ken & Bench Technician Tim Sanders inspect the author's SDM-42B at the test bench

❖ AVCOM Wants Your Feedback

Ken Parks and AVCOM are *very* interested in feedback from the user in the field. For example, during our discussion of their PSA-65C spectrum analyzer, I offered to Ken that increasing the unit's top frequency specification from 1250 MHz to 1300 MHz would then include the amateur 1296 MHz band, thus further extending potential sales. Ken took that suggestion to heart and asked his staff to determine the feasibility of making such a design change.

Current projects in development also include the SDM-42M, a custom designed CRT based spectrum display monitor unit for the U.S. Army.

Don Full, one of AVCOM's software developers, explained to us in great detail the



SDM-42M prototype unit in development for the U.S. Army

Carol Parks, AVCOM's Sales, Customer Service & Production Planning Manager

inner workings of the firmware he develops to provide the front panel user interface for each unit. Again we were particularly impressed with Don's interest in user feedback and how to improve on that interface. Don was also kind enough to "flash" the latest firmware into my SDM-42B, although the version present in my unit was only one month old.

Conclusion

AVCOM is a small company with 21 employees, totally dedicated to producing a quality product that is rugged, reliable and affordable. Ken Parks and his wife Carol, AVCOM's Sales, Customer Service and Production Planning Manager, have been with AVCOM for one year. They are making great efforts to continue focusing and refining AVCOM's product line and operations to better support the user in the field and expand their market share.

Ken and his staff take particular pride in cross training their workforce, allowing greater flexibility when redirecting effort as needed throughout the production process. Our impression was that the staff is a real family, working and communicating side by side in a positive work atmosphere. One employee we met told us that she had been with the company since it was founded in Andy Hatfield's garage!

If you need a rugged, low cost spectrum analyzer or accessories for use in your work or hobby, you should consider AVCOM's products. Our visit to AVCOM convinced us that they produce a quality product that can provide cost effective solutions to your test equipment needs, that they are serious about incorporating features recommended from the user in the field, and are committed to strong follow-on customer support.

Notes

1. You can purchase AVCOM products directly from Grove Enterprises at 1-800-438-8155; ask for Belinda, Grove's AVCOM specialist.
2. Company Contact Information: AVCOM of Virginia, Inc., 500 Southlake Blvd, Richmond, VA 23236; Tel: (804) 794-2500; http://www.avcomofva.com/

Author Biography

Colonel (Retired) Dino Papas U.S. Army, KLØS has been a ham and SWL for over 34 years. He holds a BSEE degree from the University of California at Davis and a Masters of Engineering Administration from George Washington University, although for 26 years he served on active duty as an Infantryman with ham radio, shortwave listening, computers and electronics as his top hobbies. Dino and his wife Toby KLØSS, also a retired Army Lieutenant Colonel, reside in Yorktown, VA. You can reach the author at: kl0s@arrl.net.

This is your equipment page. Monitoring Times pays for projects, reviews, radio theory and hardware topics. Contact Rachel Baughn, 7540 Hwy 64 West, Brasstown, NC 28902; email editor@monitoringtimes.com.

Another EZ-SWL Antenna Testimonial

First I'll start by saying that I have no commercial, personal or other connections with either Grove Enterprises or PAR Electronics.

I'm not sure if you'd like another letter about the EZ-SWL, but in case you'd like another point of view from a rank amateur, I'm passing along some insights and observations on my latest purchase, the PAR EZ-SWL end-fed HF antenna.

A little background: I live in a suburban development which happens to be VERY near a very busy, sprawling major airport (5 mi from Baltimore-Washington International). I also have very large electric transmission lines running about 150 ft behind my house. Added to this are such "wrinkles" as above-ground power and TV cable lines to my house and a small back yard. As you can see, an outside HF antenna really isn't in the cards.

I had been using a 66-ft center-fed dipole which I had put up in my attic which is about 20 ft above the ground. It served me quite well, albeit it was quite a noisy antenna probably due to the in-house interference from dimmers, fluorescent and halogen lights, several TVs, kitchen appliances, etc. The usual stuff.

MT's Sept '03 issue had Larry Van Horn's review of the PAR EZ-SWL antenna. After I read it I said, " PAR Electronics must have had me in mind when they developed this antenna." They were advertising a 45-ft antenna that could be deployed in several configurations – important for me because I only have a little over 34-ft of usable attic space to play with. At $59.95 (from Grove) I thought I'd give it a try – especially if it was as good as Larry's review said it was.

I had it up in the attic and running about 15-20 minutes after the UPS guy dropped it off. The construction of the antenna is superb – it's very rugged, easy to deploy, and a cinch to hook up. This is very important to me since I'm "technically challenged." I have it hooked up to my R-75 with 50-ft of coax into an antenna switch so I can still use the dipole along with the EZ-SWL. Attic space limitations precluded me putting it in a straight horizontal position, or as a sloper. So I have it deployed in a horizontal Z-shape.

After using it for awhile now, all I can say is WOW ! What an antenna! It's extremely quiet, much more so than the dipole. I'm using the factory-supplied default ground position with no external ground. Not only is it quieter than the dipole, to my ears it's also more sensitive. On the ALE nets that I listen to, I'm consistently getting significantly higher BER and S/N readings than with the dipole. Voice nets are much clearer. The signals I'm hearing with the SWL are tempting me to look into more types of digital decoding.

Using the antenna switch I can check the EZ-SWL's performance against the dipole and the SWL wins hands down. Don't get me wrong, the dipole is a good antenna under the conditions that I have it set up – but the SWL is just so much better.

Bottom line: If you have space or other restrictions that preclude an outdoor antenna at all or limit what you can out outdoors then I'd say give the SWL a look. If, however, you have to put your antenna indoors, like me, then by all means, in my opinion, you couldn't do better than the EZ-SWL. I'm tempted to get another one and deploy it up in the attic in a different configuration and do away with the dipole all together. If I had two of these deployed on opposite orientations – look out!... But that's food for thought for a future time.

Ron Perron
Utility Station Monitoring
Maryland, USA
Icom R-75 w/33-ft TFD & 45-ft EZ-SWL

Jock Elliott KB2GOM
jockelliott@monitoringtimes.com

Cobra's Super Cool Xtreme Street Communicator

"Whoa, Duuuuude! It lights up. Excellent!" With one look at this new product from Cobra Electronics, my shaggy-headed surfer persona – which had been secretly lurking in my neural cortex for years – suddenly popped out.

The cause of Big Kahuna's appearance was Cobra's New Xtreme Street Communicator 76XTR. It's an all-in-one basic mobile CB. One of Cobra's marketing people told me it was designed to provide convenient car-to-car communications for the Generation Y, fast-and-the-furious types who enjoy the delights of what a pal calls "super-tuned rice rockets." But you don't have to be a member of the Midnight Club to appreciate the 76XTR. Lots of folks, myself included, think this new two-way communicator is pretty neat.

CB Basics

But before we delve deeper, some basics: the 76XTR is designed to operate on the US 27-MHz CB band. According to the Federal Communications Commission, the Citizens Band Radio Service is an unlicensed HF two-way voice communication service for use in your personal and business activities. CB operates on the following frequencies:

26.965 CH 1	27.215 CH 21
26.975 CH 2	27.225 CH 22
26.985 CH 3	27.255 CH 23
27.005 CH 4	27.235 CH 24
27.015 CH 5	27.245 CH 25
27.025 CH 6	27.265 CH 26
27.035 CH 7	27.275 CH 27
27.055 CH 8	27.285 CH 28
27.065 CH 9	27.295 CH 29
27.075 CH 10	27.305 CH 30
27.085 CH 11	27.315 CH 31
27.105 CH 12	27.325 CH 32
27.115 CH 13	27.335 CH 33
27.125 CH 14	27.345 CH 34
27.135 CH 15	27.355 CH 35
27.155 CH 16	27.365 CH 36
27.165 CH 17	27.375 CH 37
27.175 CH 18	27.385 CH 38
27.185 CH 19	27.395 CH 39
27.205 CH 20	27.405 CH 40

Operators are limited to 4 watts AM or 12 watts single sideband. The 76XTR offers AM-only operation on all 40 channels.

By the way, the eagle-eyed among you may have noticed that, in the list above, the channels are in numerical order but the frequencies are not. This is not some sort of screw-up. The fact that Ch. 24 is lower in frequency than Ch. 23 is an artifact from the history of CB. At one point, there were only 23 channels in the Citizens Band Radio Service. When the service was expanded to 40 channels, Ch. 24 was added as you see it now.

The first time that I noticed this, many years ago, was when I was studying the manual for a CB base station. I thought certainly the manufacturer had made an error. But a check of the transceiver's frequency display confirmed that the chart above really is the frequency assignment of the 50 channels.

Not Your Father's CB

When you open the box for the 76XTR, the first thing you see is an all-in-one mobile CB transceiver that is built into the microphone. It measures 4.25 from top to bottom, 3 inches wide, and about 1.5 inches thick and has a roughly 3-foot coiled microphone cable attached to it. On the front of the unit is a backlit liquid crystal display that shows channel number, signal strength, transmit or receive status and whether dual watch is activated.

Below the LCD on the left is a button for activating the dual watch function, and a switch for choosing between CB or public address operation. Below that is a grill for the speaker and microphone. At the right side of the unit are two thumbwheels: one for on/off and volume, and the other for squelch level.

Other components included in the package are a connector box and an 11-inch magnetic mount antenna. The connector box has a power cord coming out of it and one screw-on connector each for the microphone/transceiver and the antenna.

Installing the 76XTR is easy. I chose to go the super-easy route and attached a cigarette lighter adaptor (not included, but available from most electronics stores) to the power cord. I plopped the antenna on the roof and ran the antenna cable in through the door opening. I attached the microphone/transceiver to the connector box, and everything was set to go.

Now here's where the 76 XTR gets really interesting: when you turn it on, the microphone/transceiver lights up – a brilliant neon blue! And – I hope you're sitting down, because you may not be ready for this – when you transmit, the antenna also lights up a brilliant neon blue.

The Cobra 76XTR delivers excellent short-range CB performance in a tiny package with look-at-me-first illumination of transceiver and antenna.

In a press release from Cobra, Tony Mirabelli, a Cobra Sr. VP, is quoted as saying, "The Xtreme Street Communicator is designed to do two things – get the driver noticed and enable them to talk with a large group of people from their car." No kidding, Sherlock – do ya think?

Now, I can almost guess what you're thinking: "Enough of the wowee-zowee, how does it work?" Well, frankly, with the short antenna that is furnished with the 76XTR, I didn't have high hopes, but the short answer is: *it works very well*.

Under relatively bad "skip" conditions, I easily got a couple of miles of range communicating with my base station, and the audio on both transmit and receive was absolutely excellent. If you want maximum range, you will, of course, want a bigger antenna. I've tried that and found it a nuisance. I plan to keep the 76XLT in my car because it delivers everything I want in a CB these days: the ability to communicate with the truckers during over-the-road trips and a diminutive antenna that won't bang into the overheads at the local burger joint. And – hey! – it lights up. Gnarly, dude!

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SOME COMMENTS ON WRTH 2003:

Compared to other radio handbooks, the WRTH is the only one which covers all our needs.
Anker Petersen, Danish SW Club International

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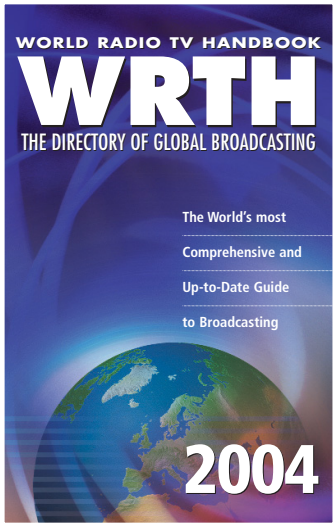
The book is very, very good. My congratulations. WRTH is the best. *G.B., Brazil*

A really fine publication on which all involved should be heartily congratulated! *D.T., UK*

The 2003 edition of the World Radio TV Handbook is a shiny new volume, and this is not only because of what you see when you first look at it, but also because of what you find in its informative and up-to-date contents. *Adrian Peterson, AWR Wavescan*

As a good general overview of worldwide broadcasting, WRTH is still the best guide on the market. Anyone waiting for a verdict on whether or not the 2003 edition is worth buying should not hesitate to place an order.
Radio Netherlands Media Network

An excellent, well-presented publication again and always within finger-tip range of my receiver.
R.S., UK



What's NEW

Tell them you saw it in Monitoring Times

Tower Site 2004 Calendar

If you're a fan of radio and television transmitter sites, don't delay in ordering this unique 2004 calendar: The last two years of Scott Fybush's Tower Site calendars were quickly sold out.

Each calendar month features an 8x11 inch full-color picture of a broadcast transmitter site, taken by Fybush during his travels around the US, Canada, and beyond. In addition to the tower photos, the monthly pages include significant dates in radio and television history as well as civil and religious holidays and major industry trade shows and events.

The 2004 calendars cost $16 including shipping ($17.28 includes sales tax for New York residents) and can be purchased by check or money order payable to Scott Fybush, 92 Bonnie Brae Avenue, Rochester, NY 14618. They can also be purchased by credit card at **http://www.fybush.com** Be sure to look around Scott's outstanding website for the "Tower Site of the Week" and his NorthEast Radio Watch broadcast news.

The IRCA Mexican Log

The 9th Edition of the *IRCA Mexican Log* lists all AM stations in Mexico by frequency, including call letters, state, city, day/night power, slogans, schedule in UTC/GMT, formats, networks and notes. The call letter index gives call, frequency, city and state. The city index (listed by state, then city) includes frequency, call and day/night power.

The log has been completely updated from the 2002 edition and carefully cross-checked by several IRCA members. This is an indispensable reference for anyone who hears Mexican radio stations.

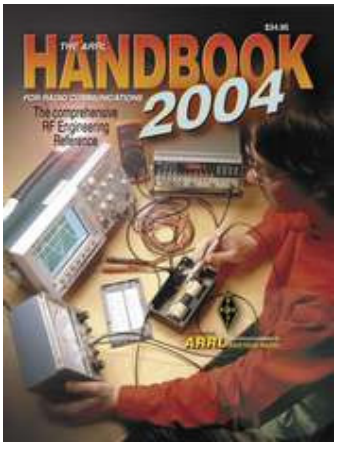
Size is 8 1/2" x 11" and three hole punched for easy binding. Prices: IRCA/NRC members - $9.50 (US/Canada/Mexico/sea mail), $10.50 (rest of the Americas airmail), $11.00 (Europe/Asia airmail), $11.50 (Australia/New Zealand airmail). Non-members: add $2.50 to the above prices.

To order the IRCA Mexican Log from the IRCA Bookstore, send the correct amount (in US funds payable to Phil Bytheway) to: IRCA Bookstore, 9705 Mary NW, Seattle WA 98117-2334

ARRL Handbook

When we think about institutions in the world of amateur radio, several things come to mind. Things such as the art of QSLing, which dates back to the very early days of the service, contesting, DXing, public service, building your own equipment, and many other facets of the hobby have stood the test of time. And so has a publication that discusses all those items and more. In fact, it is almost as famous as the amateur hobby and its publisher – *The ARRL Handbook for Radio Communications 2004*.

And now the new 81th edition (first published in 1926) has just been released and it continues the long tradition of providing a valuable reference for not only hams, but engineers and researchers. The 2004 *Handbook* is a massive 1216 pages, and inside this comprehensive RF engineering reference you'll find chapters on Introduction to Amateur Radio, Fundamental Theory, Practical Design and Projects, Construction Techniques, Operating Practices, Wireless Technology (pagers, cell phones, etc.) and much more.



New in the 2004 edition of this classic: updated information on AC/RF Sources (Oscillators and Synthesizers); revised information on Digital Signal Processing (DSP) technology; a new commercial-quality, high-voltage power (plate) supply; a high-performance easy-to-build passive CW filter; revised and updated information on cellular technology; an updated Handbook Address List with URL information.

In my early days of ham radio, as a teenager, the ARRL *Handbook* was a yearly Christmas present that helped spark my long career in the world of electronics and communications. It is a reference like no other and deserves to be on the bookshelf of anyone involved in the world of electronics and communications.

The softcover, eighty first edition (ISBN: 0-87259-196-4), © 2003, The American Radio Relay League, Inc. can be ordered from the ARRL website (**http://www.arrl.org**), on their toll-free telephone line 1-888-277-5289 (Outside US +1-860-594-0355), or via snail mail at ARRL Publication Sales Department, 225 Main Street, Newington, CT 06111-1494 USA. Order ARRL catalog number 1964 – $34.95 plus shipping. Hardcover or CD versions are also available.

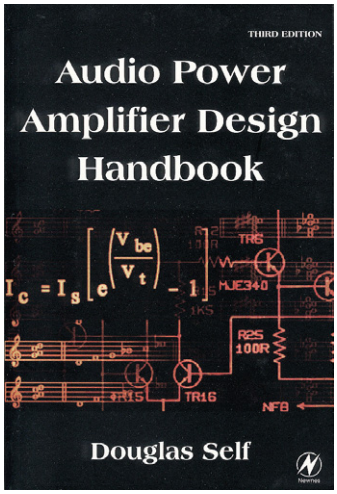
– Reviewed by Larry Van Horn, N5FPW

Audio Power Amplifier Design Handbook

by Douglas Self

Douglas Self, the author of the *Audio Amplifier Design Handbook*, 3rd Edition, has considerable experience as a design engineer specializing in audio amplifiers as well as training in the related field of psycho-acoustics. Add to this that he is both a musician and a regular contributor of articles on amplifier design to the journal *Electronics World*, and it is hard to imagine a better set of qualifications for someone to introduce us to audio-amplifier design. Drawing on his wide background the author covers both the basis of audio-amplifier design, and his own personal philosophy as to why he approaches his work as he does.

The text begins with an introduction to audio amplifiers, covering both their function and history. This is followed by chapters on the general principles of power amplifiers, small-signal stages, output stages, and power supplies. In addition there is detailed coverage of related topics such as compensation, slew rate, stability, thermal dynamics, amplifier and speaker protection, grounding, testing, and safety.



Many introductory electronic texts cover only class A, B, AB and C amplifier circuits. These classes are covered in Self's text; however, some readers will be pleasantly surprised to find that there is also coverage of the relatively more recently-evolved amplifier classes D, E, G, H, and S.

An interesting and useful concept introduced in this text is the "blameless audio power amplifier." We cannot design a perfect amplifier, but we can design a blameless amplifier; one which has been designed "so that all the easily defeated distortion mechanisms have been rendered negligible."

Although this book is definitely not casual reading it is well written, does not require the use of mathematics, and should be useful

What's NEW

Tell them you saw it in Monitoring Times

to both the professional power-amplifier designer, and the serious experimenter wanting to know more about good power-amplifier design.

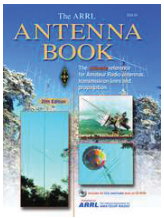
Audio Amplifier Design Handbook is published by Newnes, Elsevier Science, 225 Wildwood Avenue, Woburn, MA 01801-2041, phone 781-904-2620.

–Reviewed by W. Clem Small

The ARRL Antenna Book

First published in 1939, *The ARRL Antenna Book* is the bible for current antenna theory and a wealth of practical, how-to construction projects. While fundamentals about antennas rarely change, modern application of these fundamentals does result in new highly optimized and specialized antenna designs. The publisher indicates that because of sophisticated computer modeling, over 30% of the material in this new 20th edition has been updated over the previous edition.

Some of the new information you will discover in this softcover edition's 944 pages includes: updated information about ground systems for verticals, a completely new section on antenna computer modeling, a new section on low-frequency slopers, expanded section on stacking HF/VHF/UHF Yagis, new coverage on satellite and EME arrays, and expanded coverage on ionospheric sounding and detailed propagation predictions.



In addition to the new information above, you will also find indepth coverage of antennas, feed lines, and propagation. If you are into constructing your own antennas, the *ARRL Antenna Book* will enable you to design, build and install any imaginable type of antenna!

But there is more. Bundled with this edition is the entire book, fully-searchable, on CD-ROM and some additional software utilities. The CD-ROM supports Windows and Macintosh systems (Microsoft Windows 95 or later; or Apple Power Macintosh computer, Apple System Software version 7.1.2 or later). This CD-ROM uses the popular Adobe Acrobat® Reader software (included) to view, navigate, search and print information from all chapters of the book.

You can view the entire book – every word and every page – plus pages of band-by-band propagation tables (forecasts) for150 locations around the world for all portions of the solar cycle are included on the CD-ROM (in PDF format).

The CD-ROM included with this book includes three updated and improved programs (for Windows):

YW	Yagi for Windows
TLW	Transmission Line for Windows
HFTA	HF Terrain Assessment

In addition, some still valuable DOS programs from previous editions are included:

AAT	Analyze Antenna Tuner
SCALE	for converting Yagi antenna files to different frequencies or element tapers for YW
GAMMA	for computing gamma matches
MOBILE	for computing mobile whip parameters
MAKEVOA	to convert HFTA output files to VOACAP antenna files

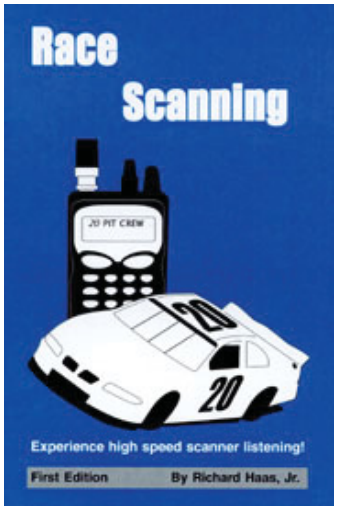
This ARRL book (ISBN: 0-87259-904-3) © 2003, sells for $39.95 plus shipping and carries League order number 9043. (See contact info above.)

– Reviewed by Larry Van Horn

Race Scanning

By Richard Haas, Jr

This slim 40-page softcover book, subtitled "Experience High Speed Scanner Listening!" is a great introduction to using a scanner at the race track, especially if the user is new to both sports. The book covers all the basics of racing – what you can expect to hear, racing terminology, what the flags mean; what equipment you'll need, including a comparison of suitable scanners, and buying versus renting; and concludes with racing frequencies for NASCAR and Indy drivers, general tips and tricks, plus pages to enter logs, frequency additions and



changes.

Illustrations help explain some racing terms and scanning hardware. The compact size is handy for use at the track, though it's too large for a pocket.

Race Scanning (ISBN: 1-882123-2-5) © 2003, is published and sold by Universal Radio Research for $4.95. Universal Radio, Inc., 6830 Americana Pkwy, Reynoldsburg, OH 43068-4113; 800-431-3939; http://www.universal-radio.com.

– Reviewed by Rachel Baughn

How to Get Anything on Anybody

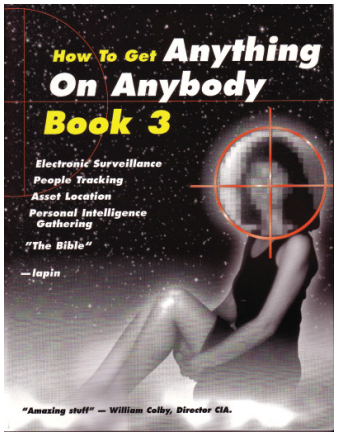
By Lee Lapin

In an era of readily-available information on just about everybody, Lee Lapin's third edition of his popular *How to Get Anything on Anybody* is now on the book stands.

This giant, 600 page compendium contains more information than has ever been available to the public before, letting you know just how agencies can place your computer under surveillance, tracking your every keystroke; find you no matter what, including your assets, phone calls, court records, associates and marriages, driving license and records, and more.

Learn how anyone can access your credit records, break your password, acquire and use surveillance equipment, see through walls, bug your room, read your computer screen remotely, tap a phone without a warrant, hide a message that won't be found, successfully perform a covert entry, and dozens more.

Author Lapin leads us through this technological treatise in anecdotal, conversational style, along with examples from his own wealth of experience. It's an easy read, often humorous, with Lapin's particular brand of irony.



This isn't a book paranoids should read, nor is it intended as a how-to for illegal activities, but if you want to know how it's done, it's here. And it's expensive. But since its predecessors are used as training manuals by federal intelligence agencies, it certainly should be good enough for our readers.

How to Get Anything on Anybody by Lee Lapin (ISBN 1-880231-13-1) is $99.95 plus $10 shipping from Intelligence Here, 404 North Mount Shasta, CA 96067; phone (530) 926-1316, or see their web site at **http://www.intelligencehere.com**

– Reviewed by Bob Grove

Books and equipment for announcement or review should be sent to " What's New?" c/o Monitoring Times, 7540 Highway 64 West, Brasstown, NC 28902. Press releases may be faxed to 828-837-2216 or emailed to Rachel Baughn, editor@monitoringtimes.com

Lawrence Harris
lawrenceharris@monitoringtimes.com

Changes in Civil and Military WXSAT Systems

Dramatic pictures of the Californian fires – as seen from space – were received from both GOES WXSATs in late October. Reuters News Service reported that (sadly) at least 13 people were killed by the state's deadliest outbreak of fires in more than a decade – a figure that was updated a few days later. The fires were driven by warm Santa Ana winds, and destroyed hundreds of square miles of dense dry brush and trees.

Figure 1 shows the view from GOES-12, the eastern WXSAT positioned at longitude 71° east. The actual image is transmitted in black-and-white, but I have used the GeoSatSignal-4 program to add artificial color. This highlights several streams of smoke blowing westward from northern California.

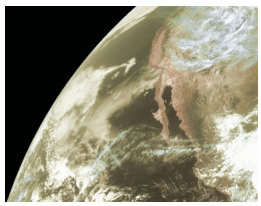


Fig 1: GOES-E 2100UTC October 27, 2003 Californian fires (Image ã EUMETSAT)

❖ Making the Best of It

NOAA-12

Based on direct readout user requests, NOAA – at first – decided to leave NOAA-12 APT on and disable NOAA-15 APT instead, during the period from early November when the VHF 'conflict' period between NOAA-12 and NOAA-15 started. NOAA-12's APT was to be transmitted instead of that from NOAA-15 until December 7, 2003.

NOAA-12 and NOAA-15 entered VHF conflict on November 3 at 1500UTC, when spacecraft separation was within 15 minutes. Their beacon frequencies are separated enough such that both can be left on during such conflicts. During this period, APT would continue from NOAA-12 on 137.50 MHz as usual.

However, one amateur pointed out that whereas NOAA-12 APT has been switched off and on many times before, and without problems, NOAA-15 is from the same family group as NOAA-16 – whose APT transmitter failed on its first switching.

After considering the points made by David Taylor (the person referred to above), NOAA decided *not* to switch off NOAA-15's APT, but to keep to the normal routine of switching off NOAA-12's APT.

NOAA-14

NOAA-14 provided some excellent HRPT imagery during mid-October (and was still good in early November). The fault that causes a loss of image synchronization on NOAA-14 HRPT has resulted in images with large areas of interference. Figure 2 shows the improvement seen in October. It is a morning (southbound) pass over western Europe, with most of Britain in sunshine, and northwest France and Spain also visible. The morning twilight zone is seen on the western side.

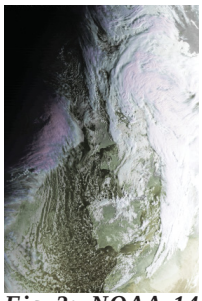


Fig 2: NOAA-14 0812UTC November 1, 2003

❖ For the Advanced Enthusiast!

The National Oceanic and Atmospheric Administration (NOAA) is planning for civil access to the next generation of polar satellites scheduled for launch in 2010. These satellites will combine the **Polar Orbiting Environmental Satellites** (POES) and **Defense Meteorological Satellite Program** (DMSP) satellites into a single constellation called the **National Polar-Orbiting Operational Environmental Satellite System** (NPOESS – see below). As a risk reduction project, NOAA will launch a test satellite in 2006 under the **NPOESS Preparatory Project (NPP)** to test selected instruments and data transmissions.

The NPP satellite will transmit data to field terminals using continuous High Resolution Data (HRD) in the X-band at a nominal downlink frequency of 7812 to 7830 MHz. When the HRD capable terminals are within the communications footprint of the satellite, the 20 Mbps data rate will enable them to receive the NPP sensor data as it is being collected at that time, at maximum resolution.

NOAA is interested in knowing who, from the civilian user community, may be interested in obtaining this (NPP) data. Interested users will have to set up a ground terminal at their own expense. Ground stations are expected to be relatively expensive, but NOAA plans to provide generic software and equipment specifications to help keep costs down. In addition, the investment should provide users with the experience needed to be on the vanguard of the NPOESS terminal development. Those interested should send an email describing the reason for their interest to: *Darrell.Robertson@noaa.gov*

❖ DMSP - The Future

I expect that, other than those involved in receiving WXSAT transmissions from the NOAA satellites, few people are probably aware that a similar set of measurements and images are also made by the satellite constellation operated by the US Air Force Space Command – the Defense Meteorological Satellite Program (DMSP) satellites. The civilian and military programs of weather imagery collection have operated side-by-side for many decades.

On May 5, 1994, President Clinton made the decision to merge the United States' military and civil operational meteorological satellite systems into a single, national system capable of providing both civil and national security requirements with space-based remotely sensed environmental data. The convergence of these separate programs is the most significant change in U.S. operational remote sensing since the launch of the first weather satellite in April 1960.

The result of President Clinton's decision is the **National Polar-orbiting Operational Environmental Satellite System** (NPOESS). It is expected to provide more than $1.8 billion savings in acquisition and operational costs through the System Life Cycle of the program compared to the cost of continuing the planned separate satellite systems within the Departments of Defense and Commerce. Recent changes in world political events and declining agency budgets prompted a re-examination of combining the two systems.

On October 3, 1994, NOAA, the Department of Defense, and NASA created an Integrated Program Office (IPO) to acquire, develop, manage, and operate the NPOESS system. Each of the participating agencies takes a lead responsibility for one of three primary functional areas:

NOAA has overall responsibility for the converged system and for satellite operations, and is also the primary interface with the international and civil user communities.

The **DoD** is responsible for supporting the IPO for major systems acquisitions, including launch support.

NASA has a primary responsibility for facilitating the development and incorporation of new cost-effective technologies into the converged system. The story continues in next month's column.

WXSAT frequencies

NOAA-12 and -15 transmit APT on 137.50 MHz (except during overlap)
NOAA-17 transmits APT on 137.62 MHz.
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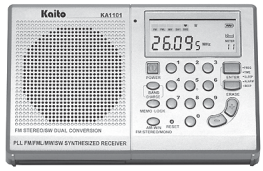

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Closing Comments

Spend a Little, Save a Lot!

By Rachel Baughn, Editor

As we've often said before, our radio hobby is in a period of transition. The question is, is the transition just another swing in regular marketing cycles or is the game winding down? We are on a proverbial "teeter totter": On one end of the seesaw are the hobbyists, clubs, and volunteer organizations and on the other are the manufacturers, retailers and commercial publications. The whole thing is balanced in the middle by factors beyond our control – the economy, the pace of technology, the changing interests of the population, available leisure time and money, and others.

Sometimes the consumers drive the market and sometimes the commercial interests push the hobby forward – it's the law of supply and demand. When both players do their part, everyone benefits, but if each waits for the other to make the next move on the seesaw, you know what happens – one side is let down and the other left hanging. And if the guy on the bottom decides he doesn't want to play anymore, the other comes down with a crash!

We're In This Together...

So each side nudging the other to stay in the game never hurts. Our readers often ask why the business end of the hobby doesn't have more of a presence at large events like air shows and hamfests to promote radio listening, or donate more giveaways and prizes to radio clubs, or make more information available on their websites, or advertise in mainstream magazines, talk radio shows or shortwave programs? It's a good question, worthy of a good answer.

Radio businesses admit that they have to spend money to make money, but they also have to make money to spend. Giveaways and on-site appearances most certainly educate attendees and create good will, but such expenditures never seem to get around to the "making money" part of the equation. The law of supply and demand doesn't work if no one is buying, or if dealers are forced to sell their products below their cost.

Businesses share a long-term set of well-known frustrations: Why do consumers expect to buy at below-cost prices? Do they expect to buy food and clothing below dealer cost? And why isn't good customer support rewarded by consumer loyalty? Further, why do hobbyists seem to feel entitled to acquire the hard-earned information and experience of others for free?

Certainly, some of this expectation of free exchange comes from the radio hobbyist's sharing throughout the recreational community. Several small, family-run commercial enterprises actually grew out of this base. Bob Grove, an involved radio enthusiast, realized that the big manufacturers and publishers were ignoring the scanner and shortwave listeners, motivating him to start Grove Enterprises and *Monitoring Times.*

Monitoring Times Kicks Off

The amount of equipment and information available to the hobbyist today is extraordinary compared to twenty years ago. And just as we get comfortable and complacent, evolving technology changes the whole picture – suddenly there's more to learn and new equipment to be acquired!

Here, at the start of 2004, it's time to start a new cycle. A number of exciting new radios are available, the economy is slowly re-igniting, and *Monitoring Times* is prepared to get its end of the seesaw off the ground with an innovative new kick-off. This effort is a challenge geared particularly toward those who buy their magazine off the newsstands on an issue-by-issue basis.

If you really enjoy *MT*, why not invest in its future and yours, and save yourself a bundle of money at the same time? Did you know that you can save over $100 by subscribing for three years instead of buying one issue at a time? Subscribers, there is a new incentive for you, too; now you'll be able to save $10 simply by subscribing for three years instead of one.

But it gets better: Starting this month, all *MT* subscribers will enjoy new, exclusive bonuses from our publisher, Grove Enterprises – discounts on leading resources which are not available to non-subscribers. These include free U.S. shipping of *Passport to World Band Radio, World Radio TV Handbook,* and *Police Call*; free shipping on the yearly *MT* anthologies plus a $5 subscriber discount; free classified line ads (up to 25 words per issue). The savings add up to more than $300 if you're currently buying from the newsstand.

If you agree with folks like Paul Gili of New Hampshire that *Monitoring Times* "*has become a World Class source of information on all aspects of the radio hobby,*" there's never been a better time to put your money where your mouth is. This magazine exists solely to support you in your hobby, and its purpose is to help you get the most enjoyment out of your radio equipment.

So, we've kicked off on our end – the next move is up to you!

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